Data-driven Web Applications
INFO 3300; CS 3300; INFO 5100

Instructor: Prof. Jeff Rzeszotarski, jeffrz [at] cornell.edu

Time & Location: Asynchronous: M/W lectures on Canvas
Synchronous: F 11:20-12:10 via Zoom

Course Prerequisites: CS 2110 & INFO 2300 (or prof. permission)

Course Website: https://jeffrz.com/info3300/
Course Announcements Q&A: https://edstem.org/us/courses/4576/discussion/
Assignment Submission: CMS

Graduate TAs: Jiajing Guo (jg2263 [at] cornell.edu)
Greg Yauney (gjy24 [at] cornell.edu)

Course Office Hours: See staff directory pinned on Ed Discussions

Contacts: Prof. Rzeszotarski for course administration
info3300staff [at] gmail.com for Prof+Grad TAs
Post to ED any content questions
Course Description

The web has become an outstanding environment for telling stories with data. This course will cover technologies for representing, modeling and displaying data in the context of interactive web pages. Practical skills for building web pages will be mixed with data mining algorithms and visualization design theory. We will use the D3 Javascript library to develop both static and dynamic visualizations, learn more about programming in Javascript, and explore web scalable vector graphics (SVG). Through design critique and formal study, we will identify the techniques visualization developers employ to create the “right” visualization for a given use case. This course introduces a number of popular data mining models and algorithms which we will incorporate into web visualizations.

Learning Objectives

- Develop competency in client-side visualization development
- Create static and interactive web visualizations using a visualization library
- Learn trade-offs and best practices for matching data to visual elements
- Get practical experience gathering and visualizing real-world data

Structure

This class contains lectures on visualization design concepts (30%) and live coding demonstrations (70%). You will complete 9 homework assignments over the course of the term, which will involve both development and design content. All students will complete two group projects in teams of 3. Group projects will have milestones to check progress and solicit feedback. There are no assigned readings for this course.

All lectures on Monday and Wednesday (with the exception of the first class) will be conducted completely asynchronously. You are expected to keep up with lecture content on your own. Please watch all videos before 11:59PM on Thursday of that week following your own schedule. While you should feel welcome to skip content that is familiar, be aware that all course work will be cumulative. In some cases, a homework will require you to view both lectures for the week in order to complete all problems.

All lectures on Friday should be considered synchronous unless otherwise noted on the course schedule. The purpose of synchronous Friday meetings is to make sure that there is at least one time each week where the entire class can meet for announcements, Q&A, and interactive activities. Critique and feedback are integral parts of the design process. At times these lectures may be viewable asynchronously in lieu of attendance. Alternative arrangements (e.g. extra session times, permitted async viewing) will be made available for those outside of EST starting in Week 2.
Viewing course materials is important to your overall success and is required, however attendance will not be taken in the form of video analytics or presence in Zoom meetings. Both of these are unreliable measures of true engagement and are often subject to error. Instead, each week there will be a short quiz which covers material discussed in lectures and activities. Quizzes are intended to be straightforward and simple to complete for those who have watched the weekly lecture content.

All coding demonstrations will make use of the course repository on Github. When recordings are released, both prompts and notes will be posted to the course repository. You are encouraged to clone the repository on your own computer at the start of class so that you can follow along and edit the prompt as the recording runs.

Students enrolled in INFO5100 will have the option of completing a second, more substantial group project. Students in 3300 and those in 5100 who are not doing a project will have a take-home exam. There is no prelim for this course.

Course Attendance & Absences

As the course is conducted online and we do not favor student monitoring tech, attendance will be taken through an online quiz. Each week a quiz will be released, to be completed before 11:59PM on Sunday (so as to accommodate individuals in alternate time zones). Quizzes are not intended to be challenging – if you have watch the weekly content you should be able to answer all questions.

Assignments & Late Work

Homework assignments will be posted to CMS on Monday and Wednesday mornings and are generally due at 11:59PM ET on the following Friday (~11 days later). Please refer to the course schedule for exact homework posting and due dates. At times you may not immediately be able to complete all sections of a homework when it is assigned. All content in the homework will be covered during its week of classes. You are not expected to work on homework or projects during Wellness Days; due dates are already extended to accommodate this. You will use CMS to submit assignments.

Any and all late work will receive a 0 score. Submissions that cannot be decompressed, contain incorrect files, or are missing key files will receive a 0 without exception. Please re-download your submissions on CMS to verify they are correct. Projects will be submitted via your group’s shared GitHub repository.

As the late policy is harsh, you will receive a total of 5 slip days for use as deadline extensions (see below in document). We will also drop the lowest homework score when computing final class grades.
Getting Help

Please make use of the following channels of communication:

- The course website and policy documentation for basic procedures and rules
- Office hours for individual help on assignments (see here for a schedule)
- Posting on the course discussion forum – please search for similar questions before you post a new one
- For personal questions, use the course email info3300staff@gmail.com
- Do not email the TAs or instructor unless they reach out to you directly
- Do not email about late homework or absences

Grading

While in the past attendance has always been integrated into final course grades, this year we will be offering two grading options. Your final grade will be computed automatically based on the better of these two options:

<table>
<thead>
<tr>
<th></th>
<th>Exam Bias</th>
<th>HW Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Attendance</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Weekly Homework</td>
<td>25%</td>
<td>35%</td>
</tr>
<tr>
<td>Project 1 &amp; 2</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Project 3 OR Take-home Exam</td>
<td>35%</td>
<td>25%</td>
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Letter grades will be assigned using the integer part of your final %. For example, 96.01 and 96.99 both resolve to 96%, which would be an A- on the grade scale.

Note that we will be using an adjusted grade point scale for this course. Due to the large amount of extra credit that you can earn, it is entirely possible for your final grade to total higher than 100%.

<table>
<thead>
<tr>
<th>&gt;=100%: A+</th>
<th>80.0%-82.9%: C+</th>
</tr>
</thead>
<tbody>
<tr>
<td>97.0%-100%: A</td>
<td>77.0%-79.9%: C</td>
</tr>
<tr>
<td>93.0%-96.9%: A-</td>
<td>73.0%-76.9%: C-</td>
</tr>
<tr>
<td>90.0%-92.9%: B+</td>
<td>70.0%-72.9%: D+</td>
</tr>
<tr>
<td>87.0%-89.9%: B</td>
<td>66.0%-69.9%: D</td>
</tr>
<tr>
<td>83.0%-86.9%: B-</td>
<td>60.0%-65.9%: D-</td>
</tr>
</tbody>
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Extra Credit
There will be several opportunities for extra credit this term. A 0.5% bonus will be awarded for anyone who completes the ALI survey in Week 2. A 1% bonus will be offered to students who post a neat visualization example from the web to the “Visualization Examples” tag on Ed Discussions. If 75% of the class completes the mid-semester survey, then the entire class will receive a 0.5% bonus to their grade. Alternatively, you can post an interesting dataset to the “Datasets” tag (no Kaggle or other major data repositories). No duplicates allowed, so do this earlier rather than later. 2% can be earned via SONA credits (see below for more details). Each remaining slip-day at the end of the term will earn 0.4% of extra credit (up to 2%).

Additional course policies:
Most if not all items in this document are based on events in class or student emails concerning rule adherence. The Instructor advises students that while it is their right to argue about small rule deviations with course staff, it is rarely in their best interest to do so when fractions of a percent of a grade are on the line. Take note that sea lawyers were often the first to be thrown overboard during a 19th century nautical mutiny, and many Dungeons & Dragons sessions have been ruined by battles over rules instead of against fictional monsters. When possible, obey the “reasonable person principle”.

In-class work
Class will often involve a programming problem that we will work on together. As class content will be delivered online, you must have a laptop with access to Canvas and Zoom. Please reach out to course staff if this is going to prove to be difficult. Please be sure to mute your audio unless directed otherwise during in-class activities and be aware of how your video and audio conduct might impact fellow students. Do not take photographs or recordings of lecture content without explicit permission. Serious technological disruptions may result in grade penalties.

Academic Integrity
**tl;dr version:** All students are expected to abide by the University’s Code of Academic Integrity. This is especially critical when working remotely, as we will be more sensitive to potential integrity issues. In the past this has been a serious problem for the course. Please make sure that you submit your own work.
We will follow university policies as outlined in the Academic Integrity Handbook. You are encouraged to discuss homework, but each student will complete assignments alone. TAs are present to assist in your learning process but are not expected to offer specific code suggestions. Learning from other individuals’ code is an important part of programming, but for group projects the code should be the work of the group members except for standard libraries such as D3, lodash, and jQuery. Any code used in projects that was not written by the group members should be placed in separate files and clearly labeled with their source URLs. If you have benefitted from online resources (such as examples or StackOverflow answers), list the URLs in comments in your own code, even if you did not directly copy anything. Recall that some workplaces ban StackOverflow outright to avoid diluting their IP. Project work that relates to your other classes or research is encouraged, but you may not recycle assignments. There must be no doubt that the work you turn in for this class was done for this class and this class alone. **This includes lecture notes and code!** Integrity issues will be adjudicated at the discretion of Professor Rzeszotarski and course staff and include penalties such as referral to the Academic Integrity Board.

Blatant instances of copying lecture notes into homework will be considered integrity violations. This is a zero-tolerance policy. If you are concerned about inadvertently duplicating course code in your submissions, try reading the course notes first, closing them out, and then coding yourself in a new environment or editor. If you get stuck, switch back again but avoid having both open at the same time.

**Citing Sources**

This section is based on an excellent [citation guide](#) created by Prof. Kyle Harms. We will largely be following these guidelines.

Any code that you did not write specifically for this class is considered to be external code. This includes example code from class, code from other classes at Cornell you wrote, and external code from web sites (e.g. StackOverflow). All code submitted for projects and homework assignments, unless otherwise indicated, must be your own. No external code will be permitted. This includes importing helper libraries like jQuery. Standards for projects will be looser in terms of importing libraries - refer to assignments for specific instructions.

Any external code used must be cited within the source code with comments.

**Late or Missing Work**
[The following rules apply under normal circumstances. If you have experienced a personal crisis or a medical condition contact the Instructor as soon as possible. The earlier we hear from you, the more we can help. We can only provide assistance if we are made aware of the problem in a timely fashion. Do not wait until the end of term to disclose potential issues which might have reduced your grades.]

If you do not submit work before the stated deadline, then we will record a zero. There will be no exceptions. This policy is harsh, but it is necessary for a class of this size. All assignment deadlines are known in advance. For most students with accommodations, you should plan ahead and complete your assignment before the deadline.

Submitted files will be graded as-is and absolutely no excuses for mistaken submissions will be accepted. Verify on CMS that you have provided the correct files after submission. Any archive files must be in a format that can be opened by recent Windows and Apple OS X computers. Unopenable submissions will receive no credit. It is your duty to submit the correct files in a timely manner and verify that Canvas has properly stored your submission before the deadline.

In the very unlikely event that CMS is down or you experience computer problems, you may email submissions to the course staff email address using your Cornell email account. You must email the file to the course staff email address before the homework due date – screenshots, file metadata, and git commit logs are too easy to modify.

**Slip Days / Extending Deadlines**

You can spend slip days in order to extend the deadline for a specific homework assignment. Slip days are specifically intended for legitimate reasons for needing an extension. This includes accommodations (e.g. medical issues, family emergencies, religious observance, athletic participation, etc.).

Each slip day will allow you to submit a homework assignment 24 hours after the deadline. You can use up to 3 slip days for an assignment, delaying submission for a total of 72 hours.

<table>
<thead>
<tr>
<th>1 slip day</th>
<th>2 slip days</th>
<th>3 slip days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra 24 hours</td>
<td>Extra 48 hours</td>
<td>Extra 72 hours</td>
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</table>

Slip days will be automatically used when assignments are graded. It is your responsibility to tracking your current slip day usage. If you have insufficient slip days
to cover a late submission, it will receive a 0 but no slip days will be consumed. Should you run out of slip days, any late assignments will automatically receive a 0.

Here are several example scenarios: A) You submit a homework 25 hours after the deadline. Our automatic script deducts 2 slip days from your total, leaving you with 3 days left. B) You currently have 2 slip days and decide to submit a homework 52 hours late. This would require 3 slip days, which you do not have. As a result, you receive a 0 and keep your current 2 slip days for future use.

Please do not notify the instructor if you intend to use slip days. Course staff use an automated script to compute and maintain slip day usage. Staff may supply CMS comments explaining your current slip day usage, but ultimately it is your job to track your use of slip days.

**Regrade Requests**

You may request a regrade, which will be granted on a case-by-case basis. Regrades requests must be submitted by email to the TA who graded your assignment. Please refer to the specific instructions on the form. Include the relevant fields in your email to your TA. No new files will be accepted.

Accepted requests will be forwarded by the TA for regrading. We want to give grades that accurately represent our assessment of your understanding of the material. Hence, if you are given a lower score than you should have received, you should absolutely bring it to our attention via the mechanism just described. However, we must explicitly mention an additional consequence of the importance of grade accuracy: if we notice that you have been assigned more points than you should have been, we are duty-bound to correct such scores downward to the correct value.

Regrades must be submitted within one week of the time in which homework was returned (no exceptions). For example, if homework was marked as "Graded" on Canvas at noon on Thursday, then regrades must be emailed before noon on Thursday of the following week. No late regrade requests will be accepted.

**On Decorum**

Though it should go without saying, please observe respectful behavior while in class lectures. This includes remaining muted during lectures unless instructed to unmute, maintaining an appropriate environment while cameras are enabled, making appropriate comments in course chat, answering questions posed to the class, and refraining from leaving during the middle of the lecture.
Should you have issues with an undergraduate or graduate teaching assistant, please reach out to the Instructor directly. Though it once again ought to go without saying, please avoid posting about "stupid TAs" on the course forum, pitting TAs against other course staff members, or calling a graduate TA "useless" to their face (all of which have happened in the past and make the instructor very sad).

**Note on Inclusiveness**

This course involves both self-directed assignments as well as in-class exercises. It is possible that in the course of this class you will encounter datasets, visualizations, or arguments that do not match your worldview or perhaps might even be upsetting. Course staff cannot guarantee such events will not occur, and do not want to hamstring the potential projects that teams can complete with a set of content requirements. Students must be respectful throughout the critique process and in-class activities, acknowledging that at times discussion can be fraught or argumentative. Course staff will not tolerate intentional displays of disrespect or marginalization during class time and out of class project work. Penalties will range from loss of participation grade to failure of projects/assignments to referral to university officials on a case-by-case basis.

Having experienced environments lacking in tolerance and inclusivity earlier in life, the Instructor will try their best to be mindful of potential issues with course content throughout the term. However, they might miss something objectionable, inadvertently encounter an instance of implicit bias, or misspeak. If during the semester you have concerns about the way the course is going or are having a negative experience, please reach out to the Instructor directly.

**Special Accommodations**

We will make every effort possible to ensure that the class works for all students. Students who have self-identified to Cornell SDS as needing special accommodations in the classroom should contact the professor at the time of enrollment or during the first two weeks of class so that any course materials can be adapted, and other appropriate arrangements made. Failure to do so may prevent us from making the proper accommodations. Lectures will not be recorded unless SDS requires it. If there is a specific event that you are concerned about (such as an exam), please inform us at least two weeks in advance so that we have time to make arrangements.

**SONA Credits**
Many researchers on campus need participants for user studies and other types of experiments. The SONA system allows you to register for studies. You will receive 0.5% extra credit for each SONA credit, up to a maximum of 2.0% for the term. Participating in studies is a great way to find out what real research looks like. To register, please visit: https://cornell-comm.sona-systems.com