CSI-703- Scientific and Statistical Visualization

LOCATION: Fairfax Campus, Peterson Hall, Room 1109

SCHEDULE: Monday 4:30 – 7:10

INSTRUCTOR: Holly Russo, PhD, hrusso@masonlive.gmu.edu

OFFICE HOURS: Contact me to make an appointment

Contents

Course Description

You are someone with a lot of great ideas and accomplishments. You need to be able to communicate your ideas and accomplishments effectively in print, online and in presentations to a wide range of audiences. Key to doing this is data visualization, which is the focus of this class. We'll cover plots, illustrations and dashboards, as well as the questions your visualizations should answer and the aspects of the audience that might derail your visualization's message.

This class will be a mixture of coding, creativity, individual projects and assignments, and in-class group activities. My goal is that you learn, participate, have fun, and leave with the skills and checklists needed to communicate effectively through visualization. My focus is on helping you explore your technical creativity, moving you out of your comfort zone, and preparing you for future success.

Prerequisites

There are no official prerequisites for this course. I will ask that you come prepared to write code; you can choose any language however my tutorials will be in Python and one of our books will give you most of the Python code you will need. R is also an excellent language for visualizations if you prefer to use it. I will walk the class through setting up a coding environment and give a quick intro.

I will also ask that you create an illustration from a research topic of interest to you. As a graduate student, it is likely that you have done at least one poster session in your career, or that you at least have a research topic of focus. Bring that idea / topic with you to focus on for the semester.

Finally, I ask that you come to the course with a sense of fun, a desire to learn, and an element of agility as we navigate winter weather and COVID, among other things.

Important Logistics

INCLEMENT WEATHER

University closings, class cancellations, late openings, or other weather-related changes in the University's operating schedule will be announced via Mason Alert and other university communications channels (e.g., www.gmu.edu, university social media, and university information (703) 993-1000).

When severe weather (e.g., snow, hurricane, or extreme heat) is anticipated, the decisions to delay opening or close the university will be made by 5:00 a.m. when possible to facilitate public notification. When possible and safety permits, mid-day modifications to class schedules and university operations will be coordinated with the academic and university event schedule.

In the event that severe weather is anticipated, I will post a message on Blackboard: I will strive to do this as early in the morning as possible, but at least one hour prior to class. Safety is your number one priority: if the university does not cancel classes but you feel it is unsafe to attend then please email me at hrusso@gmu.edu and let me know. If classes are cancelled, we will switch to a virtual session, for which I will send out the link. I will take attendance at the virtual session and it will be counted as a normal class day. My goal will be to keep us on schedule, so that you are not forced to make up the time later.

COVID

Currently, our courses are scheduled to be conducted face to face (F2F) 100%. In addition, GMU has recently updated its mask policy as follows:

Everyone, even those who are fully vaccinated, must wear a face covering when inside university property (buildings and vehicles). If you're unvaccinated, you must wear a mask outside, as well, when at an event or if physical distancing can't be maintained. Wear a mask consistently and correctly when:

- *In university facilities (indoor or enclosed space).*

- *Outside on university property if you can't maintain physical distance of at least six feet or if you're in close contact with others who are not fully vaccinated.*

- *Attending an event.*

- *Traveling to/from sites off university property for work or study if in a vehicle with other individuals.*

Follow CDC guidance and University Policy 1415 when choosing a mask and following guidance on when to wear it. Don't share face coverings.

As you arrive to each class, you may be required to show your green COVID check for that day. Please see me if you require additional accommodation. <u>Please see the Policies section of this syllabus for more in-depth information about masks and required preparations in the event we must pivot to remote learning.</u>

OTHER MEETING LOGISTICS

In addition to F2F, we will use Blackboard for collaboration. Students are encouraged to collaborate with each other frequently and hold group sessions outside of class time using Teams, Zoom, Meet or other modes convenient to the group.

For communication with me, please use email at hrusso@gmu.edu. I do not have an office, but I am very responsive by email. Chances are you can get an in-person meeting with me on campus prior to class, or a virtual meeting almost any weekday 9-5, within 24 hours of your request.

I will be taking attendance each day throughout the semester, and your attendance will be taken into account when discussing class performance issues.

Grading and Course Requirements

The goal of this course is to teach you how to communicate to a wide audience (including yourself) using visualization. In light of this and the fact that you are graduate students, it makes much more sense to base a large part of your grade on anonymous peer assessments. There will not be quizzes in this class: but there will be weekly take-home assignments which will be graded by me and by a few of your peers. These will be focused on creating and improving graphics related to your research interest.

Participation: We all benefit from a vibrant class discussion, and that is what I expect from you all for this class. Above all else, the most important thing I look for is respect for everyone in the room. ***<u>The most objective way for me to grade participation is through attendance because you have to be present to participate</u>***. Specifically, the things I would like to see are that you:

- Actively support, engage and listen to your class peers: respect every question and comment, ask or comment as a follow on to others' comments and questions.

- Arrive fully prepared to every session: complete reading, prepare questions and comments, bring all materials and /or equipment needed for class.

- Play an active role in class discussions: pay attention (to the room, not your phone), ask questions and respond when called upon.

- Advance the depth of the class dialogue: present comments or questions that help increase everyone's understanding of the discussion topic. Please note that there are times when I may need to move us along to the next topic, however I will avoid this where possible.

- Promote an environment where everyone walks away feeling that they just had a great discussion from which they learned a lot.

Please understand that listening is just as important as speaking, and each person is stronger in one or the other. If you find that speaking comes easily to you, I want you to practice listening and responding directly to what was just said. Likewise, if you find that listening is much easier for you, I want you to practice speaking when you have comments or questions.

Grades: Your overall grade will be the sum of points received for each weekly assignment. These assignments with their rubrics can be found in the assignment module on Blackboard. ***At the end of the semester, these grades will be adjusted by your attendance.*** As a reminder, I'll be taking attendance each class (partially to help me remember your names) and observing participation. It is more important to me that you participate and learn, than it is that you turn in perfect assignments on time. I'm looking for genuine learning and improvement, not box-checking. I understand that things sometimes happen and if such a thing happens then you must reach out to me to discuss it.

- Weekly assignments: 100 points max for the semester

- Participation: minus 1 point per class/week for absence

- Extra credit: TBD

Reading Material

Links to book and PDF reading materials can be found in the Course Content Module *'Links to assigned reading.'* Assigned books are available through the library except for one, which is $6.99 on Amazon Kindle. I will assign page ranges or chapters from one or more of these each week.

Course Schedule Overview

Please see the syllabus schedule on Blackboard.

Policies

Undergraduate Course Repetition

Beginning fall 2018, there is a limit of three graded attempts for this course. A W does not count as a graded attempt. Please see AP. 1.3.4 in the University Catalog and consult with your academic advisor if you have any questions.

Academic Integrity

The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using the appropriate format for this class. A simple listing of books or articles is not sufficient. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.

DIVERSITY AND INCLUSION

Student and Faculty Names and Pronouns

Gender identity and pronoun use: If you wish, please share your name and gender pronouns with me and how best to address you in class and via email. I use She / Her / Her for myself, and you may address me as "Dr. Russo" in email and verbally.

Disability Accommodations

Disability Services at George Mason University is committed to upholding the letter and spirit of the laws that ensure equal treatment of people with disabilities. Under the administration of University Life, Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. Students can begin the registration process with Disability Services at any time during their enrollment at George Mason University. If you are seeking accommodations, please visit http://ds.gmu.edu/ for detailed information about the Disability Services registration process. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474

Sexual Harassment, Sexual Misconduct, and Interpersonal Violence

Notice of mandatory reporting of sexual or interpersonal misconduct: As a faculty member, I am designated as a "Non-Confidential Employee," and must report all disclosures of sexual assault, sexual harassment, interpersonal violence, stalking, sexual exploitation, complicity, and retaliation to Mason's Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason's confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-993-3686 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance or support measures from Mason's Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.

Religious Holidays

Students who miss classes, exams, or other assignments as a consequence of their religious observance will be provided a reasonable alternative opportunity, consistent with class attendance policies stated in the syllabus, to make up the missed work. Please inform me in advance about your planned observances to enable me to work with you to create a pathway to success.

TECHNOLOGY AND PRIVACY

Student Use of Electronic Devices

Cell phones, pagers, and other communicative devices are not allowed in this class. Please keep them stowed away and out of sight. If you have an extenuating circumstance that requires you to have your phone out, please notify me prior to the start of class. Laptops or tablets (e.g., iPads) may be permitted for the purpose of taking notes and team project work. Engaging in activities not related to the course (e.g., gaming, email, chat, etc.) will result in a significant deduction in your participation grade.

Basic Course Technology Requirements

Activities and assignments in this course will regularly use the Blackboard learning system, available at https://mymason.gmu.edu. Students are required to have regular, reliable access to a computer with an updated operating system (recommended: Windows 10 or Mac OSX 10.13 or higher) and a stable broadband Internet connection (cable modem, DSL, satellite broadband, etc., with a consistent 1.5 Mbps [megabits per second] download speed or higher. You can check your speed settings using the speed test on this website.) In addition to the requirements above, students are required to have a device with a functional camera and microphone. In an emergency, students can connect through a telephone call, but video connection is the expected norm.

Course Materials and Student Privacy

All course materials posted to Blackboard or other course site are private to this class; by federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this class.

Video recordings -- whether made by instructors or students -- of class meetings that include audio, visual, or textual information from other students are private and must not be shared outside the class

Live video conference meetings (e.g., Collaborate or Zoom) that include audio, textual, or visual information from other students must be viewed privately and not shared with others in your household or recorded and shared outside the class

Course Recordings

In the event that we must pivot to conducting some or all classes remotely, then some/all of our synchronous meetings in this class will be recorded to provide necessary information for students in this class. Recordings will be stored on Blackboard [or other secure site] and will only be accessible to students taking this course during this semester.

Privacy

Students must use their Mason email account to receive important University information, including communications related to this class. I will not respond to messages sent from or send messages to a non-Mason email address.

Recording and/or sharing class materials

Sharing of instructor-created materials, particularly materials relevant to assignments or exams, to public online "study" sites is considered a violation of Mason's Honor Code. Some kinds of participation in online study sites also violate the Mason Honor code: these include accessing exam or quiz questions for this class; accessing exam, quiz, or assignment answers for this class; uploading of any of the instructor's materials or exams; and uploading any of your own answers or finished work. Always consult your syllabus and your professor before using these sites.

LockDown Browser

In the event that we must pivot to remote learning, you will need to use the LockDown Browser and a webcam for online exams. I strongly recommend that you set up the technology at the start of class so you don't have to scramble to do it if the situation suddenly changes.

The webcam can be built into your computer (internal webcam) or can be the type of webcam that plugs in with a USB cable (external webcam). Watch this short video to get a basic understanding of LockDown Browser and the webcam feature. A Quick Start Guide for Students is also available.

You will need the following system requirements for online exams:

- Windows: 10, 8, 7
- Mac: OS X 10.10 or higher
- iOS: 10.0+ (iPad only). Must have a compatible LMS integration [Details].
- Web camera (internal or external) & microphone
- A reliable internet connection

Prior to your first exam, you must install LockDown Browser following the step-by-step instructions. To ensure LockDown Browser and the webcam are set up properly, do the following:

- Start LockDown Browser, log into Blackboard and select this course.
- Locate and select the Help Center button on the LockDown Browser toolbar.
- Run the Webcam Check and, if necessary, resolve any issues or permissions your computer prompts.
- Run the System & Network Check. If a problem is indicated, see if a solution is provided in the Knowledge Base. Further troubleshooting is available through the ITS Support Center.
- Exit the Help Center and locate the practice quiz named [NOTE TO INSTRUCTOR: Create a brief practice quiz and insert name/location of quiz].
- Upon completing and submitting the practice quiz, exit LockDown Browser.

When taking an online exam that requires LockDown Browser and a webcam, remember the following guidelines:

- Ensure you're in a location where you won't be interrupted
- Turn off all other devices (e.g. tablets, phones, second computers) and place them outside of your reach
- Clear your desk of all external materials not permitted — books, papers, phones, other devices

- Before starting the test, know how much time is available for it, and that you've allotted sufficient time to complete it
- Remain at your computer for the duration of the test
- Make sure that your computer is plugged into a power source, or that battery is fully charged.
- If the computer or networking environment is different than what was used previously with the Webcam Check and System & Network Check in LockDown Browser, run the checks again prior to starting the test.

To produce a good webcam video, do the following:

- Do not wear a baseball cap or hat with a brim that obscures your face
- Ensure your computer or tablet is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed, or any other surface where the device (or you) are likely to move
- If using a built-in (internal) webcam, avoid tilting the screen after the webcam setup is complete
- Take the exam in a well-lit room and avoid backlighting, such as sitting with your back to a window

Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted

CAMPUS LOGISTICS INCLUDING COVID-RELATED CONCERNS

Safe Return to Campus Statement

All students taking courses with a face-to-face component are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (https://www2.gmu.edu/safe-return-campus). Similarly, all students in face-to-face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. Only students who receive a "green" notification are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and are thereby permitted to be in class.

Campus Closure or Emergency Class Cancelation/Adjustment Policy

If the campus closes, or if a class meeting needs to be canceled or adjusted due to weather or other concern, students should check Blackboard [or other instruction as appropriate] for updates on how to continue learning and for information about any changes to events or assignments.

GMU MASK POLICY – UNIVERSITY POLICY 1415

The university can provide face coverings to employees and students. Employees should contact Environmental Health and Safety to request a face covering. Students can go to the Student Involvement Office in the HUB, Suite 2300, to get a mask.

Guidelines include:

- Everyone, even those who are fully vaccinated, must wear a face covering when inside university property (buildings and vehicles). If you're unvaccinated, you must wear a mask outside, as well, when at an event or if physical distancing can't be maintained.

    o   Wear a mask consistently and correctly when:

    o   In university facilities (indoor or enclosed space).

    o   Outside on university property if you can't maintain physical distance of at least six feet or if you're in close contact with others who are not fully vaccinated.

    o   Attending an event.

    o   Traveling to/from sites off university property for work or study if in a vehicle with other individuals.

- Follow CDC guidance and University Policy 1415 when choosing a mask and following guidance on when to wear it.

- Don't share face coverings.

Under Policy 1415, exceptions to face covering requirements include when:

- Eating or drinking.

- Communicating with a person who is deaf or hard of hearing via lip reading.

- Someone gets an accommodation from the appropriate Mason office because of a disability.

- Students should contact Disability Services at 703-993-2474.

- Faculty, staff, and volunteers should contact Human Resources and Payroll to work with Employee Relations at 703-993-3878. Employees of contractors should work with their employer regarding accommodations.

- Someone experiences significant trouble breathing, or is unconscious or incapacitated.

- Someone needing university or medical services.

- In a resident's assigned space (no guests), in communal residence hall bathrooms when conducting personal grooming or hygiene and when eating, drinking, or sleeping.

- Alone in a private, enclosed space (e.g., an individual's office, private rehearsal space).

- When swimming or participating in water-based recreational or athletic activities.

- Actively engaging in required skills instruction or intra-squad scrimmages as part of an approved and sanctioned Intercollegiate Athletics team practice or when actively playing in an NCAA sanctioned athletic competition.

- Participating in a religious ritual.

- When participating in a performing art that requires the use of the mouth or unrestricted breathing (e.g., playing a wind instrument, singing, acting, or dance) as part of a Mason-

sanctioned performance, or as part of a group rehearsal in a performance space. Masks (or singing masks) and/or wind instrument bell covers are required for classrooms, practice rooms, or other non-performance spaces where several people are present. (A singer's mask is a reusable face covering that helps to contain droplets while creating additional space around the mouth to enable the user to sing comfortably.)

- People with weakened immune systems (regardless of vaccination status) should talk to their health care providers about face coverings and avoiding exposure risks.

University Policy 1415 COVID Public Health and Safety Precautions – Face Coverings establishes Mason requirements for wearing face coverings.

All faculty, staff, students, contractors, employees of contractors, visitors and any other individual on university property age 2 or older must follow Policy 1415 and CDC guidance for face coverings while on University Property.