CSE 578: Data Visualization

****Any information in this syllabus may be subject to change with reasonable advance notice.**

Although attendance is not mandatory, we don't have any zoom class, you can join in person if you like.

I will upload all the lectures slides / records* after each class on Canvas.

Recordings may be used to accommodate student absences in some sessions.

Note: The instructor runs a pre-packaged course developed by Dr. Ross Maciejewski, Dr. Huan Liu and Dr. Selcuk Candan with all lectures pre-recorded and delivered on-line.

About this Course

Visual representations generated by statistical models help us to make sense of large, complex data-sets through interactive exploration, thereby enabling big data to realize its potential for informing decisions. This course covers techniques and algorithms for creating effective visualizations based on principles from graphic design, visual art, perceptual psychology, and cognitive science to enhance the understanding of complex data.

Specific topics covered include

- Data transformations
- Exploratory querying
- Statistical graphics
- Time series analysis
- Exploratory spatial data analysis

Learning Outcomes

Learners completing this course will be able to

- Develop exploratory data analysis and visualization tools using Python and Jupyter notebooks
- Apply design principles for a variety of statistical graphics and visualizations including scatter-plots, line charts, histograms, and choropleth maps
- Combine exploratory queries, graphics, and interaction to develop functional tools for exploratory data analysis and visualization.

Instructor:

Samira Ghayekhloo	**sghayekh@asu.edu**
Main class:	TBA
Office hour:(By appointment)	TBA

TAs:

TBA

Graders-L2:

TBA

Grade Breakdown

Course Work	Quantity	Individual	Percentage of Grade
Auto-graded quizzes	6	Individual	10%
Staff-graded assignment(s)	5	Individual	30%
Major Project	1	Individual	40%
Final Exam (1-6)	1	Individual	20%
End-of-semester survey	1		1%
Total			101%

Grading

You must earn a cumulative grade of 70% to earn a “C” in this course. Grades in this course will include pluses (+) and minuses (-).

A+	≥ 98%	**C+**	≥ 77% and < 80%
A	≥ 93% and < 98%	**C**	≥ 70% and < 77%
A-	≥ 90% and < 93%	**D**	≥ 60% and < 70%
B+	≥ 87% and < 90%	**E**	< 60%
B	≥ 83% and < 87%		
B-	≥ 80% and < 83%		

* The instructor reserves the right to curve if necessary.

Required Prior Knowledge and Skills

- Basic statistics and computer science knowledge including computer organization and architecture, discrete mathematics, data structures, and algorithms
- Knowledge of high-level programming languages (e.g., C++, Java) and scripting language (e.g., Python)

Technology Requirements

Hardware:

Standard with major OS

Software and Other:

To complete course projects, the following application will be required:

- Jupyter Notebooks.
- Python

Textbook and Readings:

There is no required textbook for this course. Required course readings will be provided within each week these are assigned.

As an extra references:

--Munzner, T. (2014). Visualization Analysis and Design. CRC Press.
-- Zafarani, R., Abbasi, M.A., & Lui, H. (2014). Social Media Mining, An Introduction. Cambridge University Press.

Other Policies:

Remarks on Electronic Communication:

Questions about class content, homework, projects, etc., must be posted on ***Discussion page on Canvas***; otherwise, your emails will be ignored. For other class-related questions, email the instructor or TAs. Before sending an email please follow the excellent advice http://www.wikihow.com/Email-a-Professor

The instructor and TAs will try to respond to any question as soon as possible and ***within 48 hours (weekdays). Please check existing questions before posting a new one since it may have already been asked and answered***. Send emails of questions directly to the instructor or TAs only for other class-related questions.

Each unit specified by unit #_Q&A. Please write down your questions on specified unit number.

Attendance/ Absent policy:

According to the university rules, attendance and participation in class activities is an essential part of the learning process, and students are expected to attend class regularly.

Excused absences do not relieve students from responsibility for any part of the course work required during the period of absence. Faculty will provide accommodations that may include participation in classes remotely, access to recordings of class activities.

Excused absences for classes will be given without penalty to the grade in the case of (1) a university-sanctioned event [ACD 304-02]; (2) religious holidays [ACD 304-04]; a list can be found here https://eoss.asu.edu/cora/holidays]; (3) work performed in the line-of-duty according [SSM 201-18]; Excused absences do not relieve students from responsibility for any part of the course work required during the period of absence.

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No make-up for the MT / final exams.

End-of-semester survey:

It is extremely important that you respond to the final anonymous survey solicited by the university at the end of the school year. The overall feedback helps me make changes for the next year. The survey is often released 1-2 weeks before the final
at: https://fultonapps.asu.edu/eval/

Policy regarding expected classroom behavior (e.g., use of pagers, recording devices):

Any violent or threatening conduct by an ASU student in this class will be reported to the ASU Police Department and the Office of the Dean of Students.

Academic Integrity:

Students in this class must adhere to ASU's academic integrity policy, which can be found at https://provost.asu.edu/academic-integrity/policy). Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. In addition, all engineering students are expected to adhere to the ASU Academic Integrity Honor Code. All academic integrity violations are reported to the Fulton Schools of Engineering Academic Integrity Office (AIO). The AIO maintains record of all violations and has access to academic integrity violations committed in all other ASU college/schools.

Student Copyright Responsibilities:

You must refrain from uploading to any course shell, discussion board, or website used by the course instructor other course forum, material that is not the student's original work, unless the student first complies with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.

The contents of this course, including lectures and other instructional materials, are copyrighted materials. Students may not share outside the class, including uploading, selling or distributing course content or notes taken during the conduct of the course. Any recording of class sessions is authorized only for the use of students enrolled in this course during their enrollment in this course. Recordings and excerpts of recordings may not be distributed to others. (see ACD 304–06, "Commercial Note Taking Services" and ABOR Policy 5-308 F.14 Links to an external site.for more information).

Policy against threatening behavior, per the Student Services Manual, SSM 104–02:

Students, faculty, staff, and other individuals do not have an unqualified right of access to university grounds, property, or services (see SSM 104-02). Interfering with the peaceful conduct of university-related business or activities or remaining on campus grounds after a request to leave may be considered a crime. All incidents and allegations of violent or threatening conduct by an ASU student (whether on- or off-campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students.

Disability Accommodations:

Suitable accommodations are made for students having disabilities. Students needing accommodations must register with the ASU Disabilities Resource Center and provide documentation of that registration to the instructor. Students should communicate the

need for an accommodation in enough time for it to be properly arranged. See ACD 304-08 Classroom and Testing Accommodations for Students with Disabilities.

Harassment and Sexual Discrimination:

Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at https://sexualviolenceprevention.asu.edu/faqs.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, https://eoss.asu.edu/counseling is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life Services, https://goto.asuonline.asu.edu/success/online resources.html.

Creators

Ross Maciejewski
Ross Maciejewski (Dr. Ross) is an Associate Professor at Arizona State University in the School of Computing, Informatics & Decision Systems Engineering and Director of the Center for Accelerating Operational Efficiency, a Department of Homeland Security Center of Excellence. His primary research interests are in the areas of geographical visualization and visual analytics focusing on public health, dietary analysis, social media, criminal incident reports, and the food-energy-water nexus.

Huan Liu

Professor Huan Liu joined ASU in 2000 after conducting research in Telecom (Telstra) Australia Research labs and teaching at the National University of Singapore. He has extensive experience in research and development. Liu's research and teaching focuses on machine learning, data mining, and real world applications.

Selcuk Candan

K. Selcuk Candan is a professor of computer science and engineering at Arizona State University and the director of ASU's Center for Assured and Scalable Data Engineering (CASCADE). His primary research interest is in the area of management and analysis of non-traditional, heterogeneous, and imprecise (such as multimedia, web, and scientific) data.