CS 725/825, Spring 2025 Syllabus

MW 3-4:15pm, ECSB 2120 and online via Zoom

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Course Overview

Catalog Description: This course covers the theory and application of information visualization and of visual analytics, the science of combining interactive visual interfaces and information visualization techniques with automatic algorithms to support analytical reasoning through human-computer interaction. Research on visual perception, cognition, interactive visual interfaces, and visual analytics will be covered. Practical techniques for the display of complex multivariate data will be addressed. Course projects will require the development of iпnteractive web-based interfaces to analyze and visualize real-world datasets.
P **Main Activities:** During the semester, students will develop interactive visualizations using D3.js, read academic papers from IEEE VIS and other top visualization conferences, give class presentations on current topics in information visualization and visual analytics, and gain hands-on experience in visualizing real-world datasets. Time will be reserved in the semester to cover special topics selected by the class.

Prerequisite: CS 625 (Data Visualization)
If you have not taken CS 625, see What Do I Need to Know Coming into This Course?

Instructor Contact and Office Hours

Dr. Michele Weigle: mweigle at cs.odu.edu, https://www.cs.odu.edu/~mweigle/

My office hours are Mon/Wed 1:30-2:30pm (Zoom), Tue 10-11am (ECSB 3327), or by appointment. See Canvas for the link to the Zoom office hours meeting room. For Zoom office hours, students will be placed into the waiting room if I am already meeting with another student.

If you cannot attend during regular office hours, please contact me to set up an alternate appointment time.

Meeting Times and Course Delivery Method

This course will be delivered in a hybrid method, with one face-to-face section in a traditional classroom and several online sections available.

CS 725 (MS) sections:

- CRN 29120 - in-person
- CRN 27901 - WC2 (in Hampton Roads)
- CRN 27892 - WC5 (in Virginia, but outside of Hampton Roads)
- CRN 27904 - WC7 (in the US, but outside of Virginia)

CS 825 (PhD) sections:

- CRN 29121 - in-person
- CRN 27905 - WC2 (in Hampton Roads)
- CRN 27897 - WC5 (in Virginia, but outside of Hampton Roads)

- CRN 27907 - WC7 (in the US, but outside of Virginia)

The link to the Zoom class session will be made available through the Course Collaboration Tool in Canvas. All course materials will be made available through our course GitHub repository. The audio of in-person class meetings and all materials projected in class will be live streamed via Zoom, recorded, and made available via Canvas. Online students must meet the same deadlines as face-to-face students. All deadlines are based on the local timezone in Norfolk, VA.

This is a synchronous class. All students, unless otherwise arranged, are expected to actively participate during the regular class meeting time.

I reserve the right to designate any class meeting as Zoom-only due to weather, health, or to ensure the best class experience for all students.

Textbook and Materials

There is no required textbook, but Tamara Munzner's *Visualization Analysis and Design* (textbook from CS 625) is highly recommended if you don't already have it.

- author's textbook page includes author's slides from half-day and full-day tutorials, PDF versions of all figures
- online version accesssible for free via ODU
- author's keynote at d3.unconf (55 min), overview of material from book

Other materials will include papers published via IEEE Xplore digital library (link here is via ODU libraries).

You will be required to write clearly about your visualization designs and design process. For writing help, I always suggest two inexpensive books:

- *Writing for Computer Science* by Justin Zobel
- *The Elements of Style* by Strunk and White

In addition, see the online writing resources collected on my New Student Resources page.

Grading

This is a project and presentation based course. No exams will be given.

Assignment Types

Your grade in this class will be based on the following components:

Participation - 5%

- student demonstrates engagement with the instructor and classmates
- comprised of "meaningful interactions", which can include asking a content question during a class meeting, posting a question in the Canvas Discussion Board, providing the first correct/helpful answer to a classmate's question in the Discussion Board, posting about an interesting visualization in the Discussion Board, attending office hours (or alternate meeting time) to ask a question, etc.
- rubric (0-5): number of weeks with a meaningful interaction (max of 5)

Homework - 45%

- student demonstrates understanding of practical elements of course concepts through implementation
- requires an accompanying report that explains the implementation
- rubric (0-10):
    - 10 pts - A+, Excellent! All questions/tasks addressed appropriately, report is clear and thorough, only minor formatting/spelling/grammatical errors, if any.
    - 9 pts - A, Good job! Most, if not all, questions/tasks addressed appropriately, report is clear but could include more explanation, and/or a few formatting/spelling/grammatical errors.
    - 8 pts - B, OK job. Not all questions/tasks addressed appropriately and/or some fairly significant formatting/spelling/grammatical errors.
    - 7 pts - C, Needs work. Several questions/tasks not addressed appropriately and/or major formatting/spelling/grammatical errors.
    - 0-5 pts - F, Not acceptable. An attempt was made to address the questions/tasks, but it did not meet the intention of the assignment.
    - +/- 0.5 pts may be applied based on individual submissions.

Paper Presentation - 25%

- student demonstrates understanding of an academic paper from the IEEE VIS conference by teaching the class about the contributions and main points of the paper
- student provides constructive feedback on classmates' presentations
- specific expectations will be provided at the time of the assignment

Final Project - 25%

- student demonstrates understanding of course concepts by developing an interactive dashboard visualization that allows users to better understand the data
- requires a live demonstration and a report explaining design decisions and how they relate to course concepts
- same rubric as Homework Assignments

Grading Scale

The grading scale is as follows:

percentage	letter
100-94	A
93-90	A-
89-88	B+
87-84	B
83-80	B-
79-78	C+
77-74	C
73-70	C-

percentage	letter
69-0	F

There is no separate grading scale for PhD students, but PhD students will typically be held to a higher standard.

Late Assignments

Any assignment submitted after its deadline is considered late. Late assignments lose 1 point for every 24 hours they are late. Submissions over 72 hours late are not accepted. This time limit includes weekends -- they are counted just like weekdays.

- 0-24 hours late: -1 point
- 25-48 hours late: -2 points
- 49-72 hours late: -3 points
- over 72 hours late: not accepted

I reserve the right to specify that late submissions will not be accepted for particular assignments.

Summary Schedule

Note: This is a tentative schedule and may change during the semester. The complete schedule with assignments and due dates will be updated in on our class repo README.

ODU Spring 2025 academic schedule

Week	Class Date	Topic
1	Jan 13, 15	Course Intro, Data Vis Overview
2	Jan 20, 22	Mon: **NO CLASS - MLK Day** Wed: Observable, Arquero Intro
3	Jan 27, 29	Vega-Lite Refreshser, Visual Analytics Principles
4	Feb 3, 5	D3 Principles and Data Manipulation, IEEE VIS Conferences, Reading Academic Papers
5	Feb 10, 12	D3 Vis Intro, Giving Presentations
6	Feb 17, 19	D3 Vis, Handling Complexity in Data
7	Feb 24, 26	Interactivity in Vega-Lite and D3
8	Mar 3, 5	Dashboard Design, Implementing Dashboards in Vega-Lite and D3
	Mar 10, 12	**NO CLASS - Spring Break**
9	Mar 17, 19	Visualizing Uncertainty, Network and Tree Visualization, Project Discussion
10	Mar 24, 26	VIS Paper Presentations
11	Mar 31, Apr 2	VIS Paper Presentations

Week	Class Date	Topic
12	Apr 7, 9	TBA
13	Apr 14, 16	TBA
14	Apr 21, 23	Project Demos
15	Apr 28	Project Demos

Course Policies

Email/Canvas

Each student must check the class Canvas site and email daily. You should use our class Canvas Discussion Board to ask and answer general course-related questions. I will use Canvas Announcements to notify you about important updates (assignment deadline changes, office hours cancellations, etc.).

Seeking Help

The course Canvas site and course GitHub repo should be your first references for questions about the class. If you have questions about course requirements or materials, post questions using the class Canvas Discussion Boards. For extra help, attend office hours.

Attendance

This is a synchronous class, so both in-person and online students are expected to arrive (either to the classroom or to the Zoom room) on time. Your grade will be affected if you are consistently tardy. Students may leave after 15 minutes if the instructor or a guest lecturer does not arrive in that time.

In-person students: You are expected to attend class in-person unless you are sick or other arrangements have been made. If you cannot attend a class meeting in-person, you must email the instructor at least 2 hours before class time.

Online students: You should treat this as a regular in-person course and fully participate in class activities. Unless otherwise arranged, if you cannot attend a class meeting, you must email the instructor at least 2 hours before class time.

Any student participating via Zoom is expected to turn their camera on and participate as if they were physically in attendance. Students are welcome to blur their video background or use a background image.

If you have to miss a class, you are responsible checking the course Canvas site for announcements and the class video or the class GitHub repo to find any assignments or notes you may have missed.

If there are days on which the scheduled class meeting time is cancelled due to weather, there may still be assignments made and due. A post will be made to Canvas Announcements whenever the class meeting is cancelled.

Classroom Conduct

Please be respectful of your classmates and instructor by minimizing distractions during class. Cell phones and laptops must be turned to silent during class. Laptops must be closed when other students are

presenting.

If you are participating via Zoom, try to minimize outside distractions during class time.

Make-up Work

Make-ups for graded activities are possible only with a valid written medical or university excuse. It is the student's responsibility to give the instructor the written excuse and to arrange for any makeup work to be done.

Use of ChatGPT and other AI Tools

The use of ChatGPT or other AI tools is permitted *to some extent* in this class. These tools are being rapidly adopted, so it is important that you have some experience with their use.

These tools are best used to help you *work smarter*, not do your work for you. An essential part of being in graduate school is to develop skills that you will need to be successful in the workplace. If you use these tools to blindly do your homework for you, your learning will suffer and their unauthorized use will be obvious. But, if you use the tools to help clarify misunderstandings as you go, you will work and learn faster and hopefully build a solid foundation.

To use AI tools to help improve your writing, you should write your answer first and then ask the tool to improve the style or grammar. *I want to see your ideas, not the ideas generated through the use of GenAI.* **Do not simply use the homework question as a prompt. This is not acceptable use.**

For all homework assignments, you must include a list of websites or other references that you consult in solving the assignment. This includes AI tools. Not only must you include the website for the tool, but you must include a link to, or screenshot of, the conversation you had with the tool. (ChatGPT has the option to create such a link to a conversation.) You must also write out in your HW report the initial prompt that you used.

I would also like to know how you have been using AI tools. Have you used these to help learn a new API or programming language? To help correct spelling and grammar or otherwise improve your writing? Please share any useful prompts you've discovered to the "Useful AI Prompts" Discussion board in Canvas.

For some tips on safe usage of ChatGPT as a student, see CS 725/825 Student Use of ChatGPT and Other Generative AI Tools.

Note that this does not mean that ChatGPT is acceptable for use in other courses. This policy applies only for this course.

Academic Integrity

Old Dominion University is committed to students' personal and academic success. In order to achieve this vision, students, faculty, and staff work together to create an environment that provides the best opportunity for academic inquiry and learning. All students must be honest and forthright in their academic studies. Your work in this course and classroom behavior must align with the expectations outlined in the Code of Student Conduct, which can be found at https://www.odu.edu/student-conduct-academic-integrity.

The following behaviors along with classroom disruptions violate this policy, corrupt the educational process, and will not be tolerated.

- Cheating: Using unauthorized assistance, materials, study aids, or other information in any academic exercise.
- Plagiarism: Using someone else's language, ideas, or other original material without acknowledging its source in any academic exercise.
- Fabrication: Inventing, altering or falsifying any data, citation or information in any academic exercise.
- Facilitation: Helping another student commit, or attempt to commit, any Academic Integrity violation, or failure to report suspected Academic Integrity violations to a faculty member.

In particular, submitting anything that is not your own work without proper attribution (giving credit to the original author) is plagiarism and is considered to be an academic integrity violation. It is not acceptable to copy source code or written work from any other source (including other students, online resources), unless explicitly allowed in the assignment statement. In cases where using resources such as the Internet is allowed, proper attribution must be given.

Any evidence of an academic integrity violation (cheating) will result in a 0 grade for the assignment/exam, and the incident will be submitted to the Department of Computer Science for further review. Note that academic integrity violations can result in a permanent notation being placed on the student's transcript or even expulsion from the University. Evidence of cheating may include a student being unable to satisfactorily answer questions asked by the instructor about a submitted solution. Cheating includes not only receiving unauthorized assistance, but also giving unauthorized assistance. For class files kept in Unix space, students are expected to use Unix file permission protections (chmod) to keep other students from accessing the files. Failure to adequately protect files may result in a student being held responsible for giving unauthorized assistance, even if not directly aware of it.

Students may still provide legitimate assistance to one another. You are encouraged to form study groups to discuss course topics. Students should avoid discussions of solutions to ongoing assignments and should not, under any circumstances, show or share code solutions for an ongoing assignment.

Any resources or examples used in completing an assignment should be acknowledged and listed in the assignment report.

All students are responsible for knowing the rules. If you are unclear about whether a certain activity is allowed or not, please contact the instructor.

More information on academic integrity is available on the my academic integrity page.

Disability Services

In compliance with PL94-142 and more recent federal legislation affirming the rights of disabled individuals, provisions will be made for students with special needs on an individual basis. The student must have been identified as special needs by the university and an appropriate letter must be provided to the course instructor. Provision will be made based upon written guidelines from the University's Office of Educational Accessibility. All students are expected to fulfill all course requirements.

Students are encouraged to self-disclose disabilities that have been verified by the Office of Educational Accessibility by providing Accommodation Letters to their instructors early in the semester in order to start

receiving accommodations. Accommodations will not be made until the Accommodation Letters are provided to instructors each semester.

ODU Cares

Student Outreach & Support (SOS) is a service within the Dean of Students' office. SOS provides support to students who experience administrative, academic, or personal roadblocks. SOS works collaboratively with ODU's Care Team, and is here to help students achieve their personal and academic goals. To access these resources, email oducares@odu.edu.

Statement from ODU Counseling Services

ODU's Office of Counseling Services (OCS, 1526 Webb University Center) is a university agency with competent, diverse, and multidisciplinary professional staff. We are committed to supporting the emotional well-being, social development, and academic progress of all students at Old Dominion University.

College life can be a wonderful time of self-discovery, but for many, it is also a time when the awareness of mental health conditions increases. OCS services are available to assist with addressing mental health concerns that a student may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via our website at http://www.odu.edu/counselingservices. All services are free to ODU students.