Data Visualization and Exploration

TERM: Fall 2015

COURSE: CPSC 4530

TITLE: Data Visualization and Exploration

Schedule: To be determined

CREDIT: 3 Hours

FACULTY: Prof. Dalei Wu
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Phone: 423-425-4386
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Office Hours: As posted or by appointment

TEACHING ASSISTANT: To be determined
E-mail:

PREREQUISITES AND COREQUISITES: CPSC 3220, CPSC 4240 or department head approval.

COURSE DESCRIPTION: Data and image models, perception & attention, visualization software and tools, interactive visualization, Tufte's design principles, maps, graphs and networks, Hierarchies and trees, data density and small multiples, statistical graphs, text and documents, multivariate data and table, high-dimensional data. Lecture 3 hours and laboratory 2 hours. Prerequisite: CPSC 3220, CPSC 4240 with a minimum grade of C or department head approval. Laboratory/studio course fee will be assessed. Supplementary course fee assessed.

COURSE OBJECTIVES: This course is part of the UTC Data Science Program to meet a growing business need of individuals skilled in information and business intelligence, data analytics, data visualization, business programming and other software skills. This course will help UTC to meet the need of local industry such as Blue Cross Blue Shield, U.S. Xpress, UNUM, etc., and educate professionals in areas of business intelligence and big data. Specifically, the course will introduce the concepts and models of data visualization and exploration with applications to different disciplines, and explain how the human visual system processes and perceives images. The course will also discuss good design practices for visualization, and provide methods and training on using existing tools to make effective visualizations and explorations, collecting data from web sites, and programming interactive web-based visualizations in real world settings.

STUDENT LEARNING OUTCOMES:

- Students will be able to articulate the concepts and theory in data visualization & exploration. This outcome will mainly be assessed through assignments and exams. 90% of all
students will demonstrate good understanding of the concepts and theory in data visualization & exploration in each assignment. 90% of all students will score at least 70% or better on all the exams.

- Students will be able to apply storytelling principles to design coherent and clear visualizations, use principles of human perception and cognition in visualization design, and create web-based interactive visualizations using tools like JavaScript and D3. This outcome will mainly be assessed through lab assignments. 80% of all students will give correct result demos for each lab assignment.

- Student will be able to evaluate design practices of data visualization. This outcome will mainly be assessed through design practice reviews. 100% of all students will show their appreciation of good design practices of data visualization.

ATTENDANCE POLICY:
- You are responsible for all material covered and homework assignments during your absence.
- You are responsible for obtaining all handouts, assignments, etc. distributed during your absence.
- If you must miss class, homework must be turned in before class.

MAKE-UP POLICY:
Makeup tests will not be given. If you are unable to take a test, the grade of your final exam will be substituted for that grade. Failure to take the final will result in a zero.

EVALUATION:

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<th>Percentage</th>
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<tbody>
<tr>
<td>Tests</td>
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<td>Assignments and Lab Assignments</td>
<td>45%</td>
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<tr>
<th>Score Range</th>
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<tr>
<td>90 - 100</td>
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<td>80 - 89</td>
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<td>Under 60</td>
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TEXTBOOK:

Required:
- Interactive Data Visualization for the Web, Scott Murray, O'Reilly (2013) Free online version

Recommended:
- Visualization Analysis and Design, Tamara Munzner, CRC Press (2014)
- Visual Thinking for Design, Colin Ware, Morgan Kaufman (2008)
- The Functional Art: An introduction to information graphics and visualization, Alberto Cairo, New Riders (2012)


ADA STATEMENT: If you are a student with a disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) and think that you might need special assistance or a special accommodation in this class or any other class, call the Disability Resource Center (DRC) at 425-4006 or come by the office, 102 Frist Hall [http://www.utc.edu/disability-resource-center/](http://www.utc.edu/disability-resource-center/).

If you find that personal problems, career indecision, study and time management difficulties, etc. are adversely affecting your successful progress at UTC, please contact the Counseling and Career Planning Center at 425-4438 or [http://www.utc.edu/counseling-personal-development-center/index.php](http://www.utc.edu/counseling-personal-development-center/index.php)

COURSE WEBSITE AND COMMUNICATION: We will be using the UTC Learn system. You may access lecture notes, assignments, and your grades through this system. I will also use the UTC Learn system to communicate with you via email. Therefore, it is very important that your UTC email address is current. If you do not read your UTC email, please have it go to the address you do read. Failure to read an email will not relieve you of the responsibility of knowing the information.

BEHAVIOR POLICY: Disruptive behavior in the classroom will not be tolerated. Cell phones will not be tolerated during lecture or lab. Cell phone usage will result in a 0 for the exam.

ASSIGNMENT POLICIES:
- You will work on the assignments individually, unless otherwise stated.
- Late assignments will not be accepted.
- Any students submitting assignments showing evidence of inappropriate collaboration will receive a warning and a 0 for the first offence. Both the giver and receiver of the help will be penalized. Subsequently violations will be treated as an honor code violation and may result in failure in the class.

LAB POLICIES:
- Late labs will incur a penalty of 10 points for up to 1 week late, and 20 points for up to 2 weeks late. Beyond two weeks, late labs will not be accepted.
- If a lab is missed for an excused reason, a one-week extension will be granted for the lab.
- Labs will be graded for a total of 100 points.

USEFUL RESOURCES:
- Talks of Data Visualization with the Information Interfaces group at Gatech School of Interactive Computing Georgia Institute of Technology.
- Presentation, code, and data with the Visual Computing Group at Harvard University. Software, tools, and data sources with the course of cs 171 Visualization from this group.
- Resources from a course of Data Visualization at Columbia University

This syllabus is subject to change with notification on blackboard, email, or other written notification.