

**CSC 465 Syllabus**  
**Fall 2017**  
**Classroom: CDM 224**

**Dr. Eli T Brown**

**Office:** CDM 711

**Office Hours:** M from 9:00 – 9:45pm  
M from 2:00 – 2:45pm  
W from 9:00 – 9:45pm  
R from 2:00 – 2:45pm  
or by appointment

**Website:** <http://d2l.depaul.edu>

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**will respond by night of next business day**  
**include CSC 465 in the subject!**

**Dates**

**Midterm:** October 16

**Final Presentations:** November 13

**Final Project Reports Due:** November 20

***I will be away at a research conference October 1-6.***

**Course Summary:**

This course will be an introduction to data visualization techniques for exploration and analysis of large data sets from a wide range of fields including commercial, financial, medical, scientific and engineering applications. Topics will include visual encoding of numeric data, effective visualization design, graphical integrity, visualizing distributions and correlation, false-color techniques for feature extraction and enhancement, basic network graph visualization, geospatial visualization and some additional topics.

**Amount of Coding:**

The course will explore both visualization software packages and code interfaces for data visualization. We will use Tableau and R, and you will likely find yourselves drawn toward coding in R because you get more control. I may also do examples in Python if there is interest. At the end of the quarter I will discuss options for interactive visualization.

**Learning Goals:**

By the end of the quarter, students will be able to use visualization to discover insights in data. You will be able to choose appropriate visualizations to perform exploratory analysis and investigate data, and you will be able to create explanatory visualizations to communicate your findings. To do this you will leverage your knowledge of a collection of different visualization techniques along with understanding of how to appropriately apply them and optimize their appearance for clarity and integrity.

### Textbooks and Printed Resources:

The following texts are **strongly** recommended for the course.

- William Cleveland, The Elements of Graphing Data, ISBN-13 978-0963488411
- Edward Tufte, The Visual Display of Quantitative Information, 2nd Edition, ISBN-13 978-0961392147
- (on R) Winston Chang, R Graphics Cookbook: Practical Recipes for Visualizing Data, Publisher: O'Reilly Media, December 2012

Also, the following books are recommended depending on your interests

- (on MATLAB) Antonio Siciliano, MATLAB Data Analysis and Visualization, ISBN-13 978-9812837516
- (on D3) Scott Murray, Interactive Data Visualization for the Web, see <http://chimera.labs.oreilly.com/books/1230000000345/index.html>
- (more on perception) Colin Ware, Visual Thinking for Design, ISBN-13: 978-0123708960
- (more design-based view of vis) Alberto Cairo, The Functional Art: An introduction to information graphics and visualization, ISBN-13: 978-0321834737

### Software Resources:

- **Tableau** kindly provides student licenses!
  - You can go to their website and sign up as a student and they will verify your student address at DePaul: <https://www.tableau.com/academic/students>
  - You have to renew every year but it is free while you are a student
- **R Studio** is a convenient and free way to use R (the language). You can download it here, but note in the installation instructions that if you don't have R itself, you'll need to install that too by following their link: <https://www.rstudio.com/products/rstudio/download3/>

**Prerequisites:** PREREQUISITE(S): IT 403 and (CSC 401 or IT 411)

This course assumes that you have had a basic course in statistics along with an introductory programming course (e.g. Python)

### Grading:

Work in this course will be evaluated through homework assignments (4), a midterm exam and a final project. The breakdown for the grading will be

- Participation and Quizzes 5%
- Homeworks 32%
- Midterm 28%
- Final Project 35%

#### *Participation and Quizzes*

Participation in class and on the discussion board will help you engage with the material and the community, and improve your understanding of the material. Quizzes will be administered through D2L and will test the material in the lectures. These quizzes are open book/notes/friends. I ask that you consider the questions yourself in order to test yourself on the material.

#### *Homework*

Homeworks will be submitted online on the D2L website. No email submissions will be accepted. Homeworks submitted after the due date will come with an automatic 20% penalty. No homework will be accepted after the lecture following the due date because I will review the assignment. The same type of discussion with peers that is allowed on the discussion board is allowed with respect to homework assignments. Each student must turn in original work, i.e. your own write-up. Please ask if you need an extension on assignments.

### *Midterm*

The midterm will be held on the sixth week of class, February 8. Makeups for the midterm will only be given in extreme circumstances and requests for a makeup must be made as soon as possible. Documentation must be supplied of the relevant circumstances. You must take the midterm to pass the course.

### *Final project*

The final project in the course will be a group effort to build an original collection of visualizations for some data set. It will be up to your group to find an appropriate dataset. I will be providing a list of sites that have good datasets, but you are more than welcome to use data of your own. If so, please do come and see me about it so we can check that the dataset will provide enough material for the final project and will be workable in the time limits of the course.

The final project consists of both a presentation and a write-up. You will present your final project on the 10<sup>th</sup> week of class, March 8<sup>th</sup> and then you will have until the final exam date (one week later) to submit your final report.

### **Group Composition**

Groups are generally a mixture of in-class and online students, but these rules are crucial:

- There can be in-class-only and online-only groups.
- Online-only groups **MUST** have someone available to present for the last class.
- Groups that have a mix of online and in-class students **MUST** have at least 2 online students.
- In order to enforce these rules so this process runs smoothly, I reserve the right to edit group membership after you have formed them.

It can be difficult to keep online and in-class students working smoothly together. The skills practiced in doing this will be useful to your careers. I expect you all to handle this professionally, courteously and respectfully. Deviations from this will adversely affect your grade in two ways: your participation score may be reduced, and your teammates may report their dissatisfaction on the peer evaluations.

### **A note about final project groups and non-performance as a team-member on a project:**

The final project in this course is very broad in its scope allowing your group to focus on a wide range of dataset types for visualization, and on a wide range of techniques for visualizing the data. Group members are expected to participate fully and equitably in the group, and part of the final project grading rubric will be a peer evaluation that will form part of the final project grade.

Usually, the peer evaluation and documentation, including the meeting minutes, in addition to an overall desire for excellence, is sufficient motivation for individuals to contribute a fair share to the team project. However, in extreme cases, individuals have been known to completely cease contributing to a team project. If this is the case, a team has the right to notify the instructor **unanimously (other than**

**the individual being sanctioned)** that the individual is no longer contributing and the team no longer wants the individual on the team.

It is expected that a team will be able to show significant effort towards reconciling the issue prior to such an extreme action. Note also that this is not a decision to be made lightly, as expulsion from a team will result in **the loss of 40% of the of the final project grade**, i.e. the group portion of the grade, for the person expelled. Because this is such a serious decision, any team that makes this decision will also experience a deduction of **10% of the final project grade**.

#### **Attendance and Participation:**

Attendance (watching the lectures for online students) will count towards your participation score, as will participation in the online forum. You are expected to participate in online discussions with your peers. One of the most important parts of a class is building a learning community. I will be expecting you to be available to help each other with constructive suggestions.

The online discussion forums will be made available for you to discuss course topics and current trends in visualization. Inappropriate behavior, such as rude responses will be noted and will count against your participation score. Note also that posting of solutions is forbidden and will result in the forum being shut down, and also may constitute an academic integrity violation. You may give suggestions for how to attack a problem, and may discuss strategies, but code solutions are not to be posted.

#### **What to Expect:**

In this class you should expect to spend a significant amount of time outside of class reviewing course materials and topics and working on homework problems. Throughout the course, I may distribute handouts of notes on various topics, and certain in-class materials including sample programs will be available on the class website. Nevertheless you are expected to take notes during class and/or review lectures online to make sure you understand each week's material.

#### **Contacting Me:**

Please get in touch if you have questions or would like to schedule a meeting outside office hours. Email is the best option. NOTE: I respond quickly when possible, but my policy is that you should receive a response by the night of the next business day (i.e. an email Tuesday gets a response by Wednesday night). Additionally, please do not email me questions to which the answer is right here on the syllabus (e.g. when is the midterm?). You can also come to my office hours or call me during office hours. I encourage you to come get help if you need it. When you email me, **include CSC 465** in the subject.

#### **Changes to Syllabus**

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be thoroughly addressed during class, posted under Announcements in D2L.

#### **Online Course Evaluations**

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is

completely separate from the student's identity. Since 100% participation is our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation. Students complete the evaluation online in [CampusConnect](#). I personally read these after each quarter, so while Administration will review them, I will be looking carefully for useful constructive criticism that I can use to improve the course. Please help me out.

### **Extra Credit for Experiment Participation**

There are experiments going on with human computer interaction (HCI) researchers at DePaul. They need participants. You can get extra credit in this class for participating. Usually, they will start to be available around the fifth week of the quarter. Go to this link to check it out:

<http://www.cdm.depaul.edu/academics/research/Pages/Instructions-for-Participants.aspx>

### **Academic Integrity and Plagiarism**

This course will be subject to the university's academic integrity policy. More information can be found at <http://academicintegrity.depaul.edu/>. If you have any questions be sure to consult with your professor.

### **Academic Policies**

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the [University Academic Calendar](#). Information on enrollment, withdrawal, grading and incompletes can be found at: [cdm.depaul.edu/enrollment](http://cdm.depaul.edu/enrollment).

### **Students with Disabilities**

Students who feel they may need an accommodation based on the impact of a disability should contact the instructor privately to discuss their specific needs. All discussions will remain confidential.

To ensure that you receive the most appropriate accommodation based on your needs, contact the instructor as early as possible in the quarter (preferably within the first week of class), and make sure that you have contacted the Center for Students with Disabilities (CSD) at: [csd@depaul.edu](mailto:csd@depaul.edu).

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