

**CSC 465 Syllabus
Spring 2016**

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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 within a business day. Additionally, please do not email me questions to which the answer is right here on the syllabus (e.g. when is the midterm?).

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 potentially including isosurface generation and volumetric rendering.

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.

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 required for the course. They should be available on reserve at the library if you do not wish to purchase them.

- William Cleveland, The Elements of Graphing Data, ISBN-13 978-0963488411

- Oscar Perpinan Lamigueiro, *Displaying Time Series, Spatial, and Space-Time Data with R*, ISBN 978-1466565203

Also, the following books are recommended depending on your interests

- Edward Tufte, *The Visual Display of Quantitative Information*, 2nd Edition, ISBN-13 978-0961392147
- Winston Chang, *R Graphics Cookbook: Practical Recipes for Visualizing Data*, Publisher: O'Reilly Media, December 2012
- Antonio Siciliano, *MATLAB Data Analysis and Visualization*, ISBN-13 978-9812837516
- Scott Murray, *Interactive Data Visualization for the Web*, see <http://chimera.labs.oreilly.com/books/1230000000345/index.html>

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 or Javascript)

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 e-mail submissions will be accepted. Homeworks submitted after the due date will come with an automatic 20% penalty. No homework will be accepted more than one week beyond the due date for 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.

Midterm

The midterm will be held on the sixth week of class, May 5th. 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 10th week of class, June 2nd, and then you will have until the final exam date to submit your final report.

Groups must include at least one in-class member and at least one remote/online student.

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.

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 and sent via email.

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](#).

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.

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.

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