

COURSE DESCRIPTION

This course provides an introduction to computing through and exploration of the art and science of visualizing complex data via computer manipulation. During the course of the semester we will explore the tools necessary to allow the human mind to make sense of vast amounts of data through visualization (images instead of numbers). Topics will include 2D and 3D representations, programming techniques, exploration of visualizations of a variety of data types, and discussion of the art and aesthetics of scientific visualization.

LOCATION

Lecture: T-TH 2:30-4 Location TBA

Programming Lab: TBA

INSTRUCTOR

Emily Greenfest-Allen

Office: Park 246 (Computer Science Offices)

Ph: x6503

E-mail: egallen@brynmawr.edu

Office Hours: TBA or by appointment

TEXTS

Required:

Tufte, Edward R. 2001. *The Visual Display of Quantitative Information*. Graphics Press, LLC: Cheshire, Connecticut.

Optional:

Zelle, John. 2004. *Python Programming: an Introduction to Computer Science*. Franklin, Beedle, & Associates, Wilsonville, Oregon.

SOFTWARE

Python Software + IDLE: Available for download from <http://www.python.org>

SCHEDULE AND TOPICS

Week 1: 1/22, 1/24

- Class Organization
- Introduction to Visualization: Visual Perception and Principles

Week 2: 1/29, 1/31

Syllabus

- Graphical Integrity and Design
- Lab: Visualization through Computing: Introduction to IDLE and Python

Week 3: 2/5, 2/7

- About Data
- Lab: Manipulating Information in Python (Lists, Variables, Types)

Week 4: 2/12, 2/14

- Gaps and Clumps: Organizing Information
- Lab: Modules and Iteration

Week 5: 2/19, 2/21

- Univariate and Bivariate Visualization
- Lab: Functions and Parameters

Week 6: 2/26, 2/28

- Visualizing Time
- Lab: File Input/Output

Week 7: 3/4, 3/6

- Visualization Exploration: I
- Midterm (in class)

Week 8: 3/11, 3/13: Spring Break

Week 9: 3/18, 3/20

- Multivariate Data and 3-D visualization
- Lab: Multiples and Control Flow

Week 10: 3/25, 3/27

- Issues of Scale
- Lab: Geospatial Visualization

Week 11: 4/1, 4/3

- Color and Patterning
- Lab: Color Maps

Week 12: 4/8, 4/10

- Complex (High-Dimensional Visualization)
- Lab: Advanced Graphics

Week 13: 4/15, 4/17

- Visualization Exploration: II
- Lab: Projects

Week 14: 4/22, 4/24

- Projects
- Project Presentations

Week 15: 4/29, 5/1

- Project Presentations
- Final Exam (in class)

Assignments

Weekly Labs: Each week we will explore a new programming and visualization concept and begin a corresponding programming exercise. ***You will have one week to complete each laboratory exercise, which will be due by the following Thursday at 5 pm.*** Laboratories may be submitted via e-mail.

Journal: Throughout the course, we will be reading and discussing the art and science of visualization as a supplement to our in-class exploration of the method of visualizing information. This will be done through a series of readings and visualization explorations. Each week you will be responsible for either completing a reading assignment or exploring a visualization on the web and then completing a short write-up (1-2 paragraphs) that addresses a question relevant to the assignment. ***Write-ups should be submitted to class blog or via e-mail by 7 pm on Mondays.***

Exams: There will be two in class exams (mid-term and final).

Project: During the second half of the course, the class as a group will design a study and collect data to analyze and visualize using the concepts learned throughout the semester.

GRADING

Exam 1: 20%

Exam 2: 20%

Project: 20%

Lab Exercises: 30%

Journal: 10%

POLICIES

Grading. Exercises and Evaluations are graded on a point scale, based upon the number and complexity of the exercise. Thus, some programming exercises may be worth more points, and contribute more overall to your grade than others. Evaluations are worth 10 points, 3 of which are awarded just for the completion of the writing task, while the other 7 are awarded based upon the

thoughtfulness of the content. No points are awarded or refused for grammar in the evaluations as they are informal.

Challenging a Grade. If you are unhappy with an assigned grade, or would like the opportunity to redo an assignment, please speak to me ***within one (1) week*** of receiving that grade. I am very open to second chances and realize that I do make mistakes. However, please do not come to me at the end of the semester with a series of grading issues. I will assume you are fishing for points and won't take you seriously.

Late Assignments. Assignments will be docked an appropriate point value for the number of days late. The exact amount will depend on the assignment. Don't worry; I am very accommodating to extraneous circumstances.

Extensions. Requests for extensions should be made 48 hours (that's two days) before the assignment is due. I understand that emergencies happen, so feel free to request more time on shorter notice if absolutely necessary (no guarantees, though).

Working in Groups. You are welcome to work in groups on your weekly exercises. In fact, I highly recommend it, especially as the semester progresses. However, each completed assignment must be unique – i.e. do not simply copy each other's answers.

Programming Exercises. Copying someone else's program is a form of ***plagiarism*** and ***a violation of the honor code***. Even if you work together (which I encourage), please take the time to prepare your own final answers.

Extra Credit is always an option. If you are feeling unchallenged or worried about your grade, come see me and I will find something for you to do with your free time!