

# CRCP 3310 Data: Narrative, Meaning & Discovery

## Spring 2016

MWF 10 – 10:50AM, Owen Arts Center 1190

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**Office hours** are flexible, just request an appointment.

**Course Web site:** Canvas (<http://canvas.smu.edu>)

**Prerequisites:** (CSE 1342 || instructor consent) && a passion for programming.

**Texts:** None. Excerpts of numerous texts provided in class.

Recommended:

Murray, S. (2013). *Interactive Data Visualization for the Web*. Sebastopol, CA:  
O'Reilly Media

### Rationale & Primary Learning Outcomes

The goal of this course is to understand a postmodern data analysis process from end-to-end: *acquiring, parsing, filtering, mining, representing, refining* and *interacting*. This course introduces the fundamental concepts of data, database systems, Web service APIs, data mining, and data visualization. The primary learning outcomes are:

- Define essential vocabulary from the corpus of modern data analysis
- Understand the model of data representation in modern computing
- Understand the relational model, and how to design, create, and manipulate relational databases
- Apply Ruby, Python, Java or JavaScript to retrieve data from Web service APIs
- Distinguish data mining from other data interactions; identify and describe data mining strategies
- Design and construct computer programs that visualize data to inform and reveal
- Compare and assess the quality of written computer programs
- Reflect upon the history and future of data in society

*What is data? Where does it come from, and how can I get some? What does it take to obtain data, give it structure, and to get a program to reveal evidence of things that are not readily apparent? How can we make data beautiful, and affect people with its story? What is Big Data, and how does data affect me and my world?*

### Grading

Reading & Discussion	10%	93-100	A	73-76	C
Projects	80%	90-92	A-	70-72	C-
Exams	10%	87-89	B+	67-69	D+
		83-86	B	63-66	D
		80-82	B-	60-62	D-
		77-79	C+	0-59	F

Grades will be recorded in Canvas and should be visible within 24 hours of an assignment's due date.

## Course Schedule

This schedule is subject to change according to the actual progress of the course.

<b><u>Week</u></b>	<b><u>Lecture</u></b>	<b><u>Work</u></b>
1	Introduction, Setup	Configure dev env
2	What is Data? Unstructured Data. Local Stream Processing w/ Java	Project 1: Letter Frequency
3	Where is Data? Structured Data. Data Sources, Acquisition	Project 2: Data Structures
4	Parsing Data. Web, XML and JSON	Project 3: HTTP
5	Relational Databases. SQLite and friends	Project 4: CRUD
6	Relational Database Design	Project 5: Normalized Design
7	NoSQL Database Systems. Redis, Mongo, etc.	Project 6: K-V Stores
8	Data Mining I: Exploring Data	Project 7: Summary Stats
9	(Spring Break)	
10	Data Mining II: Families of Algorithms	Project 8: Cluster Analysis
11	Data Visualization for the Web: HTML, CSS, JavaScript	Project 9: Web Pages
12	Data Visualization for the Web: DOM, JavaScript Libraries	Project 10: D3.js
13	Data Visualization Studio I	Final Project
14	Data Visualization Studio II, Presentations	Final Project, Mid-Presentations
15	Data Visualization Studio III	Final Project
16	Data Visualization Studio IV, Presentations	Final Project, Presentations
17	Presentations	Presentations

## Class Structure

This course is not based on passive learning and the classic lecture format. Each class meeting is broken into approximately two segments, plus one out-of-class segment:

- *Discussion.* The instructor introduces the concept for the lesson to discuss.
- *Demonstration.* The instructor demonstrates the application of concepts.
- *Implementation.* Students implement concepts, validating an understanding of concepts.

Students should always bring a laptop to class, and can expect an active learning environment.

## Attendance

A significant amount of work is done collaboratively in class, and attendance is critical. This is a fun but challenging course that demands your consistent participation.

## Reading & Discussion

You will receive short homework assignments that will almost always be reading assignments. You will be expected to write a response to reading assignments, and must be prepared to discuss the reading in class.

## Project

Most of your labor in this course will involve applying demonstrated concepts, tools and techniques while working on short, focused projects that will almost always be computer programs. The work accomplished in the short projects will help support your ability to complete the final project.

## Final Project

Most of your labor in this course will involve continuous work on a semester-long project. This is a team-based project, and each team must present the status of its work mid-semester, and at the end of the semester. The project must demonstrate an understanding of the data visualization process. The instructor will provide more details about the expectations.

## Late Work Policy

Late work is not accepted in this course, and students are expected to be present, prepared and participating during every class meeting. Exceptions may be made if advanced notice is given to the instructor. It is the responsibility of the student to make arrangements prior to any scheduled examination or assignment.

## On Collaboration & Academic Integrity

*Students are encouraged to discuss and collaborate as much as possible.* However, it is obviously not acceptable to copy another student's solution. Your work must be your own. In addition, simply copying solutions found online is not acceptable. Be aware that homework assignments, projects and exams will not just focus on producing correct code, but explaining how things work.

Please see the Student Handbook for details on academic dishonesty. No exceptions will be made for students found simply giving away or taking another's solutions.

## Examples of Academic Misconduct

To clarify what constitutes illegitimate collaboration, please note the following examples of what is considered inappropriate.

- Viewing another student's quiz, test, paper, or code while working on your own.
- Directly providing another student a copy, electronic or otherwise, of your work.
- Accepting a copy, electronic or otherwise, of another student's work.
- Copying and pasting *any* component of another student's work into your own.
- Copying solutions found online or otherwise, pasting it into your own work without proper citation.

These scenarios will be considered as academic misconduct except when involving an assigned project partner.

**Rules in a nutshell: “no hands.”** When discussing or observing the work of others, your hands should not be doing anything, and you should leave the discussion empty-handed.

## Academic Integrity Pledge

Being enrolled in this course means that you pledge to uphold the high standards of academic ethics and integrity expressed by the Southern Methodist University Student Honor Code by which you are bound. In particular, you will not misrepresent the work of others as my own, nor will you give or receive unauthorized assistance in the performance of academic coursework. You should understand that your instructor would report any infraction of academic integrity to the Office of the Dean of Student Life and that any such matter would be investigated and prosecuted fully. Typically, the penalty is a grade of F in the course.

## Accommodation

Students needing academic accommodations for a disability must first be registered with Disability Accommodations & Success Strategies (DASS) to verify the disability and to establish eligibility for accommodations. Students may call 214-768-1470 or visit <http://www.smu.edu/alec/dass> to begin the process. Once registered, students should then schedule an appointment with the professor to make appropriate arrangements.

## Religious Observance

Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

## **Excused Absences for University Extracurricular Activities**

Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalog)