

Schedule (subject to change)

All readings should be completed by the following week.

All assignments are due on the date listed, prior to the start of class, at 7pm.

Date	Topic / Guest / Readings	Assignments due
2015-09-01	<p>Introductions; Jupyter and command line basics; VM setup.</p> <p>Guest: Shmuel Ben-Gad, Gelman Library</p> <p><u>Readings</u> Required: Software Carpentry Lesson: The Unix Shell, http://software-carpentry.org/lessons.html</p> <p>Required: JHU Reproducible Research on Coursera, week one videos, https://www.coursera.org/course/repdata/ (about one hour)</p> <p>Recommended: Data Science at the Command Line, chapters 1-5</p>	None
2015-09-08	<p>The command line; input, output, and pipelines; csvkit; data types. Book review project.</p> <p><u>Readings</u> Required: Wickham, "Tidy Data." http://vita.had.co.nz/papers/tidy-data.pdf</p> <p>Required: Software Carpentry Lesson: Using Databases and SQL, Topics 1-5, http://software-carpentry.org/lessons.html</p> <p>Recommended: Data Science at the Command Line, chapters 6-8</p>	#1
2015-09-15	<p>Command line filters; parallel processing.</p> <p><u>Readings</u> Required: Software Carpentry Lesson: Using Databases and SQL, Topics 6-10, http://software-carpentry.org/lessons.html</p> <p>Required: Database System Concepts, chapters 1-3 (slides at http://codex.cs.yale.edu/avi/db-book/; text recommended)</p> <p>Optional: Learning SQL, chapters 1-4</p>	#2
2015-09-22	No class	None
2015-09-29	RDBMS: schema, keys, basic SQL operations, aggregate	#3, and book

	<p>functions, subqueries.</p> <p><u>Readings</u> Required: Database System Concepts, chapters 4, 5, 7, 8 (slides at http://codex.cs.yale.edu/avi/db-book/; text recommended)</p> <p>Optional: Learning SQL, chapters 5, 6, 7, 9, 10</p> <p>Optional: Write Great Code, Volume I: Understanding the Machine (online through GW Libraries at http://findit.library.gwu.edu/item/5966168), chapters 2-5</p> <p>Optional: A Gentle Introduction to Algorithm Complexity Analysis (online at http://discrete.gr/complexity/)</p> <p>Optional: Visualizing Algorithms (online at http://bost.ocks.org/mike/algorithms/)</p>	reviews start
2015-10-06	<p>RDBMS: joins, integrity, schema design and E-R models, normal forms; using MySQL from Python and R. Group project.</p> <p><u>Readings</u> Required: Database System Concepts, chapters 11-13 (slides at http://codex.cs.yale.edu/avi/db-book/; text recommended)</p> <p>Optional: Learning SQL, chapters 12, 13, 14</p>	#4
2015-10-13	No class	
2015-10-20	<p>RDBMS: transactions, functions, triggers, indexes, query processing and optimization</p> <p><u>Readings</u> Required: Star Schema, chapters 1-5</p>	#5
2015-10-27	<p>Warehouses: facts and dimensions, architectures, schemas</p> <p><u>Readings</u> Required: Star Schema, chapters 6-8</p>	#6
2015-11-03	<p>Warehouses: dimension design</p> <p><u>Readings</u> Required: Star Schema, chapters 11-13</p>	#7
2015-11-10	<p>Warehouses: fact table design</p> <p><u>Readings</u> Required: Star Schema, chapters 14-18</p>	#8

2015-11-17	Midterm exam Warehouses: performance, tools, documentation <u>Readings</u> Required: Dean and Ghemawat, "MapReduce: Simplified Data Processing on Large Clusters." http://research.google.com/archive/mapreduce.html Required: Drake, "Command-line tools can be 235x faster than your Hadoop cluster." http://aadrake.com/command-line-tools-can-be-235x-faster-than-your-hadoop-cluster.html Required: Redis project. http://redis.io/ and Try Redis http://try.redis.io/ Optional: Chang et al. "Bigtable: A Distributed Storage System for Structured Data." http://research.google.com/archive/bigtable.html Optional: DeCandia et al. "Dynamo: Amazon's Highly Available Key-value Store", http://www.read.seas.harvard.edu/~kohler/class/cs239-w08/de-candia07dynamo.pdf	#9
2015-11-24	noSQL and beyond: map/reduce, Hadoop, Redis, Dynamo <u>Readings</u> Required: CAP theorem. https://en.wikipedia.org/wiki/CAP_theorem Required: Apache Spark. https://spark.apache.org/ Required: Apache Storm. http://storm.apache.org/ Required: Apache Drill. https://drill.apache.org/ Required: AWS Redshift. https://aws.amazon.com/redshift/ Required: AWS Kinesis. https://aws.amazon.com/kinesis/	#10, book reviews end
2015-12-01	Spark and PySpark	#11
2015-12-08 (?)	Group projects	Group projects