Schedule (updated 2016-11-22)

All required readings should be completed by the following week.

Date	Topic / Readings	Deadlines
2016-08-30	Introductions; computing setup: Jupyter notebook and command line shell basics; Git and GitHub basics. Readings for next week: Required: Software Carpentry Lesson: The Unix Shell, http://swcarpentry.github.io/shell-novice/ Required: Roger Peng on Reproducible Research (three videos): http://tinyurl.com/jhu-reproducible-research Optional: Software Carpentry Lesson: Version Control with Git, http://swcarpentry.github.io/git-novice/	Exercise #1, Friday, 9/2, 12pm
2016-09-06	The command line shell: input, output, and pipelines; csvkit; data types. Readings Required: Wickham, "Tidy Data." http://vita.had.co.nz/papers/tidy-data.pdf Optional: Data Science at the Command Line, chapters 1-5	Exercise #2, Friday, 9/9, 12pm
2016-09-13	Command line filters in the shell and Python; parallel processing in the shell. Readings Required: Software Carpentry Lesson: Using Databases and SQL, Topics 1-5, http://swcarpentry.github.io/sql-novice-survey/ Optional: Data Science at the Command Line, chapters 6-8	Project #1, Friday, 9/23, 12pm
2016-09-20	RDBMS: schema, keys, basic SQL operations, aggregate functions. Readings Required: Software Carpentry Lesson: Using Databases and SQL, Topics 6-10, http://swcarpentry.github.io/sql-novice-survey/ Optional: Learning SQL, chapters 1-4; Database System Concepts, chapters 1-3	Review #1, Tuesday, 9/27, 7pm
2016-09-27	RDBMS: subqueries, joins, integrity, transactions, functions, triggers, schema design and E-R models, normal forms.	Exercise #3, Friday 9/30, 12pm

	Readings Optional: Learning SQL, chapters 5, 6, 7, 9, 10 Optional: A Gentle Introduction to Algorithm Complexity Analysis (online at http://discrete.gr/complexity/) Optional: Visualizing Algorithms (online at http://bost.ocks.org/mike/algorithms/)	
2016-10-04	RDBMS: advanced SQL, ETL, indexes, query processing, analysis, and optimization, SQL from Python. **Note:** no office hours on Tuesday, October 4. Readings Required: Star Schema, chapters 1-5 Optional: Learning SQL, chapters 12, 13, 14	
2016-10-11	**No class** **Note:** no office hours on Tuesday, October 11.	
2016-10-18	Warehouses: facts and dimensions, architectures, schemas Readings Required: Star Schema, chapters 4-7	Exercise #4, Monday, 10/24, 12pm
2016-10-25	**No class (fall break)**	
2016-11-01	Warehouses: dimension design Readings Required: Star Schema, chapter 11 Required: AWS Redshift. https://aws.amazon.com/redshift/	Project #2, Friday, 11/11, 12pm
2016-11-08	Warehouses: fact table design Readings 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	Review #2, Tuesday, 11/15, 7pm

	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/decandia07dynamo.pdf	
2016-11-15	Contemporary data management tools: Map/Reduce, Hadoop, Trifacta <u>Readings</u> Required: Apache Spark. https://spark.apache.org/ Required: Lambda Architecture. http://lambda-architecture.net/	Exercise #5, Friday, 11/18, 12pm Final Project, Friday 12/9, 12pm
2016-11-22	Contemporary data management tools: Spark introduction <u>Readings</u> Required: Spark SQL and DataFrames Programming Guide. spark.apache.org/docs/latest/sql-programming-guide.html Optional: CAP theorem. https://en.wikipedia.org/wiki/CAP_theorem Optional: Kudu. http://getkudu.io/ Optional: AWS Kinesis. https://aws.amazon.com/kinesis/	
2016-11-29	Contemporary data management tools: Spark SQL, DataFrames, MLib, Streaming, Column-oriented storage	Exercise #6, Friday 12/2, 12pm Final Project presentations Tuesday, 12/6
2016-12-06	Final Project presentations, course wrap-up	Review #3, Tuesday, 12/12 12pm