

[COG SCI 88: Data Science and The Mind](#)

Monday 12-2pm @ 105 Cory Hall

Instructor: Yang Xu (yang_xu_ch -at- berkeley dot edu)

Lab assistants:

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Course Description

How does the human mind work? We will explore this question by analyzing a range of data concerning such topics as human rationality and irrationality, human memory, how objects and events are represented in the mind, and the relation of language and cognition. This class provides young scientists with critical thinking and computing skills that will allow them to work with data in cognitive science and related disciplines.

Prerequisites

Concurrent or previous enrollment in the course *Foundations of Data Science*. Enrollment would prioritize *freshmen* and *sophomores*.

Readings

We will read published articles and book chapters in cognitive science and closely related disciplines.

Assessments

This course involves a combination of seminars and practical sessions. The assessments will be based on in-class exercises (30%), homework assignments (20%), project (20%), quizzes (10%) and final exam (20%).



Letter grade and course policies

See [here](#)  .














































Office hours

Thursday 1:20-2:50pm @ 553/5 Evans Hall

Data Science with Python: A brief tutorial

All data analyses will be performed in Python (Jupyter). A draft tutorial (subject to update) can be downloaded [here](#)  .

Schedule (subject to adjustment as course progresses)

Session	Date	Description	Readings	Assignments
1	Jan 23	Overview		data1  data2  ; demo script 
2	Jan 30	Information processing  (Ex 1)	Cognitive: Miller (1956)  <Optional> Technical: bit  ; scatter plot 	Demo [notebook  ; data ] Ex 1 [response link  ; data  ; notebook  ; submission link ]
3	Feb 6	Object recognition  (Ex 2)	Cognitive: Shepard & Metzler (1971)  <Optional> Logothetis & Scheinberg (1996)  Technical: mean  (plot ); standard deviation  (plot )	Demo [notebook ] Ex 2 [response link  ; data  ; notebook  ; submission link ]
4	Feb 13	Event representation  (Ex 2.5)	Cognitive (ignore mathy parts): Huttenlocher et al. (1988)  Technical: permutation test  <Optional> Telescoping effect 	Demo [notebook ] Ex 2.5 [notebook  ; submission link ]
5	Feb 27	Category representation  (Ex 3)	Cognitive: Rosch (1975)  Technical: mean squared error  ; Euclidean distance  ; histogram  <Optional> Linear regression 	Demo [notebook ] Ex 3 [notebook  ; submission link ] Hw 1 (due in TWO weeks) [notebook  ; data  ; feature list  (auxiliary data); submission link ]

6	Mar 6	Judgment & decision making (Ex 4)	Cognitive: Tversky & Kahneman (1974) Technical: box plot <Optional> Pearson correlation The Bayes rule (theorem)	Demo [notebook] Ex 4 [notebook ; submission link]
7	Mar 13	Words & language (Quiz 1)	Cognitive: Zipf (1949) Technical: Zipf's law <Optional> More on Zipf's law	Demo [notebook] Hw 2 (Hw 1 due) [notebook ; data ; submission link]
8	Mar 20	Color words & cognition (Project begins)	Berlin & Kay (1969)	Project [instruction ; code+data]
9	Apr 3	Numerals & number cognition (Project proposal round-table)	Cognitive: Pica et al. (2004) Technical: Weber's law	Hw 3 (Hw 2 due) [response link ; data ; notebook ; submission link] Project proposal due [email to: yang_xu_ch@berkeley.edu]
10	Apr 10	Special lecture: Sentiment in language	Additional readings on sentiment & naive Bayes	GitHub repo link
11	Apr 17	Special lecture: Language and probabilities (Quiz 2 cancelled)	Additional readings on sentence processing & Bayes	Notebook slides and files (Hw 3 due)
12	Apr 24	Data blitz (Project report due)	Final exam	Project report due [email to: yang_xu_ch@berkeley.edu]