AI Prelim

(Last update: June 2016)

There are two parts: (i) An exam that focuses on foundations, (ii) Coursework breadth requirements.

Exam Syllabus

(1) General Foundations

- ~~Linear algebra / SVD + eigenvectors -- Strang Linear Algebra and Its Applications 4th Edition, 5.1-5.3, 6.3~~
- ~~Optimization basics: gradient descent, Newton's method -- Boyd & VdB 9.1-9.5~~
- Multivariate Gaussians -- Jordan (J.) 13
- Kalman Filtering and Smoothing -- J. 15
- ~~Info theory basics -- Cover and Thomas 2.1-2.6~~   see _notes

(2) CS188++

- ~~Uninformed Search -- Russell & Norvig 3rd ed. (R&N) 3.1-3.4~~
- ~~A* Search and Heuristics -- R&N 3.5-3.6~~
- ~~CSPs I, II -- R&N 6.1-6.5~~
- ~~Local Search -- R&N 4.1-4.2~~
- ~~Logic and Planning -- R&N 7.1-7.7 (omitting 7.5.2), 8.1-8.3.3, 9.1-9.4, 10.1-10.2, 12.1-12.3~~
- ~~Game trees -- R&N 5.2-5.5~~
- ~~Utilities / decision theory -- R&N 16.1-16.3~~
- ~~MDPs and RL -- R&N 17.1-17.4, 21.1-21.6~~
- ~~Decision theory / VPI -- R&N 16.5 & 16.6~~
- ~~Graphical models -- R&N 14.1-14.5, J. 2 (independence/factorization), J. 3 (elimination), J. 4 (propagation-factor graphs)~~
- ~~HMMs R&N 15.1-15.5, J. 12 (hmm)~~

(3) CS189++

- ~~Statistical concepts -- J. 5 (Statistical Concepts)~~
- ~~Linear regression -- J. 6 (Linear Regression and the LMS Algorithm)~~
- Logistic regression -- J. 7 (Linear Classification)
- ~~SVMs, kernel methods -- R&N 18.9; Ng pp. 1-8~~
- ~~Nearest neighbor -- R&N 18.8-18.8.3; Hastie, Tibshirani, Friedman (HTF) 13.3.0~~ see _notes
- ~~Decision trees -- R&N 18.3; HTF 9.2.1-9.2.3~~
- ~~Neural nets -- R&N 18.7~~   see _notes
- Clustering, k-means, mixture of Gaussians -- J. 10 (Mixtures and Conditional Mixtures)
- ~~PCA -- HTF 14.5.1~~   see _notes
- ~~EM -- J. 11 (EM Algorithm)~~

Jordan readings available [here](#)

Hastie, Tibshirani, Friedman (HTF) readings available [here](#)

Coursework Breadth Requirements

A grade of at least A- on 3 out of the following 8 on the full list, with at least one from the blue list and at least one from the gold list

- full list: 281A, 281B, 227B, 280, 287, 288, 262, 267
- blue list: 281A, 281B, 227B
- gold list: 280, 287, 288, 262, 267