

# XCS229 Resource Handout Map

Below is an outline of all concepts covered in both XCS229i ML and XCS229ii ML Strategy and Intro to RL.

## 1 Supervised Learning

### 1.1 Supervised Learning & Discriminative Algorithms

1. Linear Regression
2. Batch/Stochastic Gradient Descent
3. Normal Equation
4. Locally Weighted Regression
5. Probabilistic Interpretation of Linear Regression
6. Logistic Regression (Further reading: [Binary Classification & Logistic Regression](#))
7. Newton's Method
8. Perceptron (Further reading: [Perceptron](#))
9. Logistic Regression
10. Exponential Family
11. Generalized Linear Models (GLM)
12. Softmax Regression

### 1.2 Generative Learning Algorithms

1. Gaussian Discriminant Analysis
2. Generative & Discriminative Analysis
3. Naive Bayes
4. Laplace Smoothing
5. Event Models

### 1.3 Kernels and Support Vector Machines

1. Support Vector Machines (Further reading: [Representer Functions](#))
2. Kernels

### 1.4 Decision Trees

1. Decision Trees
2. [Ensemble Methods](#) (Further reading: [Boosting](#))

## 2 Unsupervised Learning

1. [K-means Clustering](#)
2. [Mixture of Gaussians](#)
3. [Expectation Maximization \(EM\) Algorithm](#)
4. [Factor Analysis](#)
5. [Independent Component Analysis](#) (Further reading: [Principal Component Analysis](#))

## 3 Deep Learning (Neural Networks)

1. Backpropagation (Further reading: [Supplemental notes on backpropagation](#))
2. Activation Functions
3. Vanishing and Exploding Gradients
4. Initialization Schemes

## 4 Machine Learning Theory

1. Bias/Variance Tradeoff (Further reading: [Bias Variance Calculations](#))
2. [Error Analysis](#)
3. [Regularization and Model Selection](#)

## 5 Reinforcement Learning

1. [Reinforcement Learning and Control](#)
2. [LQR, DDP, and LQG](#)