Review Guide for CSCI 381/780 2nd Mid-term Exam
(Includes most important concepts; may not be complete.)

**Basic concepts**
Understand basic concepts such as accuracy, true/false positive rate, true/false negative rate, sensitivity, specificity, and ROC curve. The difference between generative model vs discriminative model.

**Lagrange multiplier (math primer)**
Understand how to use Lagrange multiplier to solve optimization problems under constraints.

**Neural networks**
Understand artificial neuron, activation functions (especially sigmoid function), and the derivation of the back propagation algorithm.

**Maximum Likelihood Estimation**
Understand how to define and optimize a likelihood function given a machine learning problem and obtain maximum likelihood estimations for the parameters involved.

**Logistic regression**
Understand how the logistic regression model is derived from log odds ratio and sigmoid function. Know how to estimate the parameters from both Bayesian perspective and discriminative perspective.