Topic	Applied Predictive Modeling (KJ)	An Introduction to Statistical Learning	Pattern Recognition and Machine l	Other Sources
Background: Linear Algebra review				**Andrew Ng Coursera, Sec III**
Overview				
Types of predictive analytics	Chapter 1, 2	Chapter 1, Chapter 2 (2.1)	Chapter 1	**Andrew Ng Coursera, Sec I**
Role within data mining proces	Chapter 2	-	-	
Probability Recap	-	-	Chapter 1 (1.2 - pg 12), Chapter 2 (2.1, 2.2, 2.3)	
Example: KNN and Curse of Dimensionality	Chapter 4 (4.2, pg 65)	Chapter 2 (2.2 - pg 39) Chapter 3 (3.5 - pg 104), Chapter 6 (6.4)	Chapter 1 (1.4 - pg 33), Chapter 2 (2	HTF 2.3
Data Pre-processing				
Datatypes	Chapter 1 (1.4 Pg 7)	-	-	
Imputation	Chapter 3 (3.4)	-	-	
Outlier detection	Chapter 6 (Pg 109-111)	-	-	
Transformations	Chapter 3 (3.1-3.3)	-	-	
Sampling (Data Reduction)	-	-	-	web resources linked to notes
Subset Selection (Data Reduction)	Chapter 19	Chapter 6 (6.1-6.5)	-	
PCA (Data Reduction)	Chapter 3 (3.3 Pg 35)	Chapter 10 (10.2)	Chapter 12 (12.1 - Pg 561)	**Andrew Ng Coursera, Sec XIV**
FLDA (Data Reduction)	Chapter 12 (12.3 Pg 287 - very deta	Chapter 4 (4.4)	Chapter 4 (4.1.4 - Pg 186)	
MDS (Data Reduction)	-	-	Chapter 12 (12.4.3 - Pg 595)	https://en.wikipedia.org/wiki/Multidimensional_scaling
Visualization	-	-	-	web resources linked to notes
SVD			HTF pg. 535	Tutorial article on Canvas
Multiple Linear Regression				
MLR	Chapter 6 (6.1, 6.2)	Chapter 3	Chapter 3 (3.1.1 - 3.1.2)	**Andrew Ng Coursera, Sec II, IV**
Collinearity	Chapter 5 (5.2) - not detailed	Chapter 3 (3.3 Pg 99)	-	
Advanced Multivariate Regression - I				
Parametric Models	-	-	-	
Example: Polynomial Curve Fitting	-	-	**Chapter 3 (3.1)**	
Least Squares	Chapter 6 (6.1, 6.2)	Chapter 3	**Chapter 3 (3.1.1)**	
Model Complexity and Overfitting	Chapter 4 (4.1, 4.2)	-	-	
Regularization to avoid overfitting	Chapter 6 (6.4)	Chapter 6 (6.2)	**Chapter 3 (3.1.4)**	**Andrew Ng Coursera, Sec VI**
Ridge Regularization	Chapter 6 (6.4)	Chapter 6 (6.2)	**Chapter 3 (3.1.4)**	
Lasso Regularization	Chapter 6 (6.4)	Chapter 6 (6.2)	**Chapter 3 (3.1.4)**	
Evaluation	Chapter 5 (5.1)	Chapter 2 (2.1), Chapter 3 (3.1.3)	-	
Bias-variance Tradeoff	Chapter 5 (5.2)	Chapter 2 (2.2)	**Chapter 3 (3.2)**	
Model Tuning	Chapter 4	-	-	
Advanced Multivariate Regression - II				
Gradient Descent	-	-	**Chapter 5 (5.1-5.2)**	**Andrew Ng Coursera**
Stochastic Gradient Descent	-	-	**Chapter 5 (5.2)**	**Andrew Ng Coursera VII**
Multi-layered Perceptron	Chapter 7 (7.1,7.5 - pg 141)	-	**Chapter 5 (5.1-5.2)**	**Andrew Ng Coursera VIII, IX**
K-Nearest Neighbor	Chapter 7 (7.4 - pg 159)	Chapter 2 (Pg 39)	Chapter 2 (2.5.2)	
Multi-level Modeling	-	-	-	
Classification - I				
Decision Trees	Chapter 14 (14.1, 14.2)	Chapter 8 (8.1)	Chapter 14 (14.4)	

Bayes Decision Theory	-	Chapter 4 (4.4)	**Chapter 1 (1.5)**	**DHS Ch 2, link in notes**	
Evaluating Classifiers (ROC, AUC, Lift)	Chapter 11	Chapter 5 - only cross-validation explaine	-		
Classification - II					
Linear Models, FLD			**Chapter 4.1**		
Naive Bayes	Chapter 13 (13.6)	-	Chapter 1 (1.5)		
Belief Networks	-	-		**Kevin Murphy tutorial, link in notes**	
Logistic Regression	Chapter 12 (12.2)	Chapter 4 (4.3)	Chapter 4 (4.3.2)		
Support Vector Machines	Chapter 13 (13.4)	Chapter 9	Chapter 7.1	Andrew Ng Coursera, Sec XII; HTF 12.1-12.3	
K-nearest neighbors	Chapter 13 (13.5)	Chapter 4 (4.6.5)	Chapter 2 (2.5.2)		
Advanced Multivariate Regression - III					
Regression Trees	Chapter 8 (8.1-8.3)	Chapter 8 (8.1)	-		
Support Vector Regression	Chapter 7 (7.3)	-	Chapter 7 (7.1.4)		
Ensembles					
Bagging/Boosting/Random Forests	8.4-8.6, 14.2-14.5	Chapter 8.2, 8.3	-		
GBDTs				Ch 10 (advanced)	
Classifiers for Imbalanced Data					
Data Preprocessing	Chapter 16	-	-		
Oversampling/Undersampling	Chapter 16	-	-		
Ensembles of alpha-trees	-	-	-	Paper by Park & Ghosh on Canvas	
Semi-supervised Learning	-	-	-		
Tackling Big Data	-	-	-	**Andrew Ng Coursera, Sec XVII; ref in notes.**	
* Multilevel Modeling Reference*					
A Primer by A. Hayes: ftp://131.252.97.79/Transfer/ES_Pubs/ESVal/multilevel_analysis/hayes_06_multilevel_primer_socialsci.pdf;					
An Overview Article by A Gelman: http://www.stat.columbia.edu/~gelman/surveys.course/Gelman2006.pdf ;					
Web Resources: http://www.bristol.ac.uk/cmm/links/					