Week	Topic	Content	Tools
1	Intro to Analytics Data Science Toolkit	Analytics Background, Tools and Techniques, Descriptive, Predictive, and Prescriptive Analytics, Data Preparation, Programming in R & Python, Excel, Relational Database and SQL	Internet Excel, R, Python MySQL
2	Statistics and Probability in Analytics	Descriptive Statistics, Probability Theory, Selected Probability Distributions, Bayesian Probability, Inferential Statistics, Test Statistics, Hypothesis Testing, Correlation Analyses	Excel, R
3	Regression Analyses	Linear and Logistics, Lasso and Ridge	R, Orange, Weka
4	Clustering and Classification	Supervised vs unsupervised, k Means, k Nearest Neighbors, Hierarchical, Support Vector Machine (SVM)	R, Weka, Orange
5	Decision Trees	CART, C4.5, Random Forest	R, Weka, Orange, iDAS
6-7	Machine Learning Project I	Select one machine learning project (group or individual), present in the class, demonstrate end-to-end process from data selection, modeling using one or more techniques, implementation, and evaluation	Machine Learning Tools and Techniques
8	Neural Networks and Deep Learning	Architecture, Backpropagation, Gradient Descent, Deep Networks, Deep Belief Network (DBN), Convolutional Neural Network (CNN), Recursive Neural Network (RNN)	Weka, iDAS, TensorFlow, R and Python Libraries
9	Bayesian Approaches	Naïve Bayesian Classifier (NBC), Bayesian Networks, Influence Diagrams	Genie, Hugin
10	Text Analytics	Natural Language Processing, Document Classification, Word2Vec, Sentiment and Social Network Analyses	aText, NLTK
11-12	Machine Learning Project II	Select one machine learning project (group or individual) demonstrating bagging and boosting	Machine Learning Tools and Techniques