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| **Week** | Topics and Events | **Readings & Assignments** |
| 1\* | Introduction “How to Solve It” listFoundational Skills | Polya: Pages 1 – 36 and selected topics from Part III**Monty Hall Conundrum exercise** |
| 2 | Algorithms vs. Heuristics Problem Organization and Planning Process | Polya: selected topics from Part III**Choose Student Presentation Topic** |
| 3\* | Data Mining OverviewDatabase SystemsDecision Support SystemsData Warehousing | Dunham: Pages 1 – 45**Multivariate Analysis exercise** |
| 4\* | Statistical Data MiningData AnalysisData ScrubbingBayesian Analysis | Dunham: Pages 46 – 72**Multivariate Analysis exercise****Noisy Data & Missing Values exercise** |
| 5 | Statistical Data MiningHypothesis TestingRegressionCorrelation | Dunham: Pages 46 – 72**Multivariate Classification exercise****Noisy Data & Missing Values exercise** |
| 6\* | ClassificationBayesian ClassificationK Nearest Neighbors Algorithm | Dunham: Pages 73 – 124**K Nearest Neighbors Algorithm exercise** |
| 7 | ClassificationID3CARTNeural Network Supervised Learning | Dunham: Pages 73 – 124**ID3 exercise****C4.5 exercise** |
| 8 | ClusteringSquared Error ClusteringK-Means ClusteringNearest Neighbor Clustering | Dunham: Pages 125 – 163**K-Means Clustering exercise****Research Project Proposals Due** |
| Break | BREAK WEEK | None |
| 9\* | ClusteringClustering with Genetic AlgorithmsSelf-Organizing Map | Dunham: Pages 125 – 163**Self-Organizing Map exercise** |
| 10 | Association RulesBasic AlgorithmsParallel and Distributed Algorithms | Dunham: Pages 164 – 192**Association Rules exercise #1** |
| 11\* | Association RulesAdvanced Association Rule TechniquesMeasuring the Quality of Rules | Dunham: Pages 164 – 192**Association Rules exercise #2** |
| 12 | Neural NetworksBiological FoundationsActivation FunctionsLearning Optimization | Supplementary Readings**Backpropagation Network exercise****Self-Organizing Map exercise – revisited** |
| 13\* | Machine LearningLearning and Memory ModelsSupervised Learning Algorithms | Supplementary Readings**Evolutionary Computataion exercise** **Noisy Data exercise** |
| 14 | Machine LearningUnsupervised Learning AlgorithmsGenetic AlgorithmsBiological FoundationsEvolutionary AlgorithmsSearch (Min-Max) Algorithms | Supplementary Readings**Genetic Programming exercise****Evolutionary Optimization exercise #1** |
| 15 | Genetic AlgorithmsOptimal Solution Algorithms | Supplementary Readings**Evolutionary Optimization exercise #2**Research Report Due |
| 16 | EXAM WEEKResearch Reports | Research Report Presentations |