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| **Week** | Topics and Events | **Readings & Assignments** |
| 1\* | Introduction  “How to Solve It” list  Foundational 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 Mining  Data Analysis  Data Scrubbing  Bayesian Analysis | Dunham: Pages 46 – 72  **Multivariate Analysis exercise**  **Noisy Data & Missing Values exercise** |
| 5 | Statistical Data Mining  Hypothesis Testing  Regression  Correlation | Dunham: Pages 46 – 72  **Multivariate Classification exercise**  **Noisy Data & Missing Values exercise** |
| 6\* | Classification Bayesian Classification  K Nearest Neighbors Algorithm | Dunham: Pages 73 – 124  **K Nearest Neighbors Algorithm exercise** |
| 7 | Classification ID3  CART  Neural Network Supervised Learning | Dunham: Pages 73 – 124  **ID3 exercise**  **C4.5 exercise** |
| 8 | Clustering  Squared Error Clustering  K-Means Clustering  Nearest Neighbor Clustering | Dunham: Pages 125 – 163  **K-Means Clustering exercise**  **Research Project Proposals Due** |
| Break | BREAK WEEK | None |
| 9\* | Clustering  Clustering with Genetic Algorithms  Self-Organizing Map | Dunham: Pages 125 – 163  **Self-Organizing Map exercise** |
| 10 | Association Rules  Basic Algorithms  Parallel and Distributed Algorithms | Dunham: Pages 164 – 192  **Association Rules exercise #1** |
| 11\* | Association Rules  Advanced Association Rule Techniques  Measuring the Quality of Rules | Dunham: Pages 164 – 192  **Association Rules exercise #2** |
| 12 | Neural Networks  Biological Foundations  Activation Functions  Learning Optimization | Supplementary Readings  **Backpropagation Network exercise**  **Self-Organizing Map exercise – revisited** |
| 13\* | Machine Learning Learning and Memory Models  Supervised Learning Algorithms | Supplementary Readings  **Evolutionary Computataion exercise**  **Noisy Data exercise** |
| 14 | Machine Learning  Unsupervised Learning Algorithms  Genetic Algorithms  Biological Foundations  Evolutionary Algorithms  Search (Min-Max) Algorithms | Supplementary Readings  **Genetic Programming exercise**  **Evolutionary Optimization exercise #1** |
| 15 | Genetic Algorithms  Optimal Solution Algorithms | Supplementary Readings  **Evolutionary Optimization exercise #2**  Research Report Due |
| 16 | EXAM WEEKResearch Reports | Research Report Presentations |