

# MIS 636: Decision Support Systems – Winter2015

## COURSE INFORMATION

**MIS 636: Decision Support Systems**

**Location: Online**

**All classes will be held Online using WebEX.**

**Live Class Meeting Times: Friday 6:30 - 9:20 PM**

**All in-class lectures will be “recorded”. Some lectures will be “pre-recorded”.**

## INSTRUCTOR INFORMATION

**Dr. Prakash Shrivastava**

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**Office Location: Online**

**Office Hours: By *appointment***

## **COURSE OVERVIEW**

Organizations invest a significant part of their information technology (IT) budget to capture, store and analyze data. The return on these investments will depend on how effectively organizations analyze the data and use it to support managerial decision making. Business Intelligence or business analytics are common terms used to describe the process of building models to support decision making. The course is structured to give the students a conceptual understanding of various modeling techniques with a focus on their application to business problems.

## **LEARNING OBJECTIVES**

At the end of the course, the student should be able to:

- Frame a business problem to build a decision support model
- Assess data needs to build a decision support model
- Prepare data for mining and decision support
- Build classification and clustering based decision support models
- Interpret and Evaluate decision support models
- Understand the advantages and pitfalls of different modeling techniques

## **PREREQUISITES**

Basic Excel and Database skills, Knowledge of basic statistics

## **REQUIRED BOOK & SOFTWARE**

**Text Book:** “Data Mining for Business Intelligence” 2-nd Edition, Wiley Publishing 2010. ISBN: 978-0470-52682-8

**Required Software:** JMP 11 Pro and XLMiner

## **Other Resources**

- JMP/SAS: [www.jmp.com/learn](http://www.jmp.com/learn)
- Data sources and articles at [www.kdnuggets.com](http://www.kdnuggets.com)
- Government Data Source: [data.gov](http://data.gov)
- Teradata University: <http://www.teradatauniversitynetwork.com/tun/>

**Detailed Session Plan**  
(The following is a tentative schedule\*)

DATE	PLAN
1/9/15 Week – 1	<ul style="list-style-type: none"> <li>• <i>Introductions</i></li> <li>• <i>Course Overview and Course Roadmap</i></li> <li>• <i>Chapter – 1: Introduction to Decision Support Systems and Data Mining</i></li> <li>• <i>Framing Business Problems to Build a Decision Support Model</i></li> <li>• <i>Reading Assignment – (1) Data Scientist – The Sexiest Job of the 21-st Century (2) Competing on Analytics (3) Types of Analytics</i></li> <li>• <i>Discussion Forum - 1: Provide some Examples of Business Problems and Data Requirements</i></li> </ul>
1/16/15 Week - 2	<ul style="list-style-type: none"> <li>• <i>Chapter – 2: Overview of Data Mining Process (CRISP, SEMMA) – (skip 2.6 and 2.7 for now)</i></li> <li>• <i>An Introduction to Data Mining Tools (JMP and XLMiner)</i></li> <li>• <i>Categorical Variables, Dummy Variables, Category Scores, etc</i></li> <li>• <i>Discussion: Data Quality, Missing Values, etc.</i></li> <li>• <i>Hands-On Exercises -</i></li> <li>• <i>Reading Assignment: (1) Crisp Model, (2) SEMMA Model (3) Comparison pf Processes, (4) Rethinking the Dimensions of Data Quality (5) Improve Data Quality for Competitive Advantage</i></li> <li>• <i>Discussion Forum – 2: Share your experience about Decision Making Process and Data Quality</i></li> </ul>
1/23/15 Week – 3	<ul style="list-style-type: none"> <li>• <i>Chapter – 4: Dimension Reduction</i></li> <li>• <i>Data Summaries, Correlation Analysis, Reducing no of Categories</i></li> <li>• <i>Chapter – 3: Data Visualization</i></li> <li>• <i>Basic Charts, Multidimensional visualization</i></li> <li>• <i>Hands-On Exercises: Data Exploration and Visualization</i></li> <li>• <i>Reading Assignment – (1) The Determinants of Foreign Box Office Revenue for English Language Movies (2) Business Analytics: Moving from Descriptive to Predictive Analytics</i></li> <li>• <i>Discussion Forum – 3: Discuss Value of Data Exploration and Visualization</i></li> </ul>
1/30/15 Week – 4	<ul style="list-style-type: none"> <li>• <i>Chapter – 6: Multiple Linear Regression (MLR)</i></li> <li>• <i>Chapter – 5.3: Performance Measures of MLR Models: MAPE, MAE, MAD, SSE, RMSE</i></li> <li>• <i>Hands-On Exercises</i></li> <li>• <i>Reading Assignment: (1) At Disney Parks, a Bracelet Meant to Build Loyalty (and Sales)</i></li> <li>• <i>Discussion Forum – 4: Discuss an example of MLR application</i></li> <li>• <i>Recap of Data Mining Processes, Data Exploration and Visualization, Preparing for Quiz next week</i></li> </ul>
2/6/15 Week – 5	<ul style="list-style-type: none"> <li>• <b>Quiz – 1: Covers material through Week – 5 (60 minutes)</b></li> <li>• <i>Chapter – 10: Logistic Regression (LR)</i></li> <li>• <i>Chapter 5.1,2: Performance Measures and Variable Selection in Logistic Regression</i></li> <li>• <i>Hands-On Exercises – Logistic Regression</i></li> <li>• <i>Reading Assignment: (1) Estimating Demand using MLR (URL provided)</i></li> <li>• <i>Discussion Forum – 5: Potential Applications of Logistic Regression in your Industry</i></li> </ul>
2/13/15 Week – 6	<ul style="list-style-type: none"> <li>• <i>Chapter – 5: Recap of Evaluating Performance of Prediction and Classification Model</i></li> <li>• <i>Recap of Classification Performance Measures: Confusion Matrix, Lift Charts, Decile and ROC Charts, Cut-Off values</i></li> <li>• <i>Hands-on Exercises</i></li> <li>• <i>Discussion Forum – 5: Discuss use of Performance Measures (KPIs) in Business</i></li> </ul>
2/20/15 Week – 7	<ul style="list-style-type: none"> <li>• <i>Chapter – 9: Classification and Regression Trees (CART)</i></li> <li>• <i>Introduction to Classification Trees</i></li> <li>• <i>Measures of Impurities, Steps in Developing Regression and Classification Trees</i></li> <li>• <i>Pros and Cons of Classification and Regression Trees</i></li> <li>• <i>Hands-On Exercises – Comparison of Predictive Models using Multiple Methods</i></li> <li>• <i>Reading Assignment - TBD</i></li> <li>• <i>Discussion Forum – 6: Discuss use of CART methods in your Industry</i></li> </ul>
<b>2/27/15</b>	<ul style="list-style-type: none"> <li>• <b>Mid – Term Recess: No Classes</b></li> </ul>

3/6/15 Week – 9	<ul style="list-style-type: none"> <li>• Chapter – 11: Neural Networks</li> <li>• Concepts and Structure of Neural Networks</li> <li>• Training of Neural Networks and Back propagation of Errors</li> <li>• Preparation for Mid-Term Exam</li> <li>• Hands-On Exercises – Classification and Prediction using Neural Networks</li> <li>• Reading Assignment – TBD</li> <li>• Discussion Forum – 8: Discuss use of Neural Network Applications in your Industry</li> </ul>
<b>3/13/15 WK -10</b>	<ul style="list-style-type: none"> <li>• <b>Open Discussion / Q&amp;A regarding material covered</b></li> <li>• <b>Mid-Term Exam (90 Minutes)</b></li> </ul>
3/20/15 Week -11	<ul style="list-style-type: none"> <li>• Chapter – 14: Cluster Analysis</li> <li>• Introduction to Clustering</li> <li>• Concepts and Measures of Distance between Observations and Clusters</li> <li>• Hierarchical Clustering Methods</li> <li>• K-means clustering</li> <li>• Hands-On Exercises – Segmentation of Customers</li> <li>• Reading Assignment – TBD</li> <li>• Discussion Forum – 9: Discuss use Clustering Methods in your Industry</li> </ul>
3/27/15 Week – 12	<ul style="list-style-type: none"> <li>• Association Rules – Ch 13</li> <li>• Concepts of Frequent Items Sets, Support, Lift, and Confidence</li> <li>• Generating Candidate Association Rules; Selecting Strong Association Rules</li> <li>• Review for Quiz - 2</li> <li>• Hands on Exercises – Generate Association Rules for a Fast Food Restaurant</li> <li>• Reading Assignment – TBD</li> <li>• Discussion Forum – 10: Discuss use of Association Rules in your Industry</li> </ul>
4/3/15 Week – 13	<ul style="list-style-type: none"> <li>• <b>Quiz – 2 Covers all material through Week – 12 (60 minutes)</b></li> <li>• Chapter – 7: K- Nearest Neighbors</li> <li>• Hands-on Exercises</li> <li>• Reading Assignment – TBD</li> <li>• Discussion Forum – 11: Discuss use of K-NN in your Industry</li> </ul>
4/10/15 Week – 14	<ul style="list-style-type: none"> <li>• Chapter – 8: Naïve-Bayes Classification</li> <li>• Hands-On Exercises</li> <li>• Discussion Forum – 12: Discuss use of Naïve-Bayes in your Industry</li> <li>•</li> <li>• Tentative: Guest Lecture - TBD, Title of the Topic – TBD</li> <li>•</li> </ul>
4/17/15 Week – 15	<ul style="list-style-type: none"> <li>• Integrated View of Data Mining in Decision Support Systems; Pros and Cons of various DM Methods</li> <li>• About Managing Data Mining Projects</li> <li>• Review for Final Exam</li> </ul>
4/24/15 Week - 16	<ul style="list-style-type: none"> <li>• <b>Final Exam (120 minutes)</b></li> </ul>

*\*Note: This is a tentative schedule. Every effort will be made to adhere to it. However, the instructor reserves the right to make any changes to it as necessary. The changes will be announced in the class and sent out as an email through Moodle.*