Syllabus of Record

Program: CET Shanghai
Course Code / Title: (SH/ITEC 320) Business Analytics
Total Hours: 45
Recommended Credits: 3
Primary Discipline / Suggested Cross Listings: Information Systems and Technology / Data Science, Business Administration and Management, Economics, Finance, Statistics
Language of Instruction: English
Prerequisites/Requirements: Introductory Information Technology, Introduction to Business Statistics

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Description
Analytics is the process of transforming data into insight for making better decisions. It involves specifying a question, problem, or decision and finding the right answers using data. The process begins with identifying the appropriate data sources (internal and external, structured and unstructured) and the appropriate models, tools, and methods for analysis. This course covers both the descriptive and predictive areas of analytics. Descriptive analytics examines historical data and identifies and reports historical patterns and trends, while predictive analytics predicts future trends and outcomes and discovers new relationships. Students are introduced to models, tools, and methods that are commonly used in each area of analytics. They gain skills in analytics that allow them to present data-driven solutions to problems in different business disciplines and functions. The course emphasizes model development and use of software tools to manage, report, and analyze data to achieve the best outcomes for a business.

Objectives
After completing Business Analytics, a student should be able to:

- Obtain and process data from existing data sources.
- Use descriptive techniques to summarize data.
- Build forecasting models to predict future outcomes.
- Apply clustering techniques to data sets.
- Apply prediction methods for numerical outcomes to data sets.
- Apply classification methods for qualitative outcomes to data sets.
- Recognize opportunities to apply analytics in various functional areas of an organization.
- Use several common techniques to visualize data.

Course Requirements
Students are required to attend each class as outlined in the CET Attendance Policy. Graded assignments are:

- Activities: The in-class activities require a small group of students to address one or more challenges based on a real-world dataset or problem using techniques from the course. Each activity takes 1 to 1.5 hours. You must attend class that day and be an active participant in a group to receive credit.

- Assignments**:** These involve the use of software and will be submitted via Canvas. Discussing assignments with classmates is encouraged; however, the submitted write-up must be the student's own work. Writing quality is included in grading.
- Exams: There are in-class, closed-book midterm and final exams. The use of any electronic device other than a calculator is prohibited. The final exam only includes material covered since the midterm.
- Business Analytics Project: A team with 4-5 students identifies an organization and builds models and methods to enhance data-driven decision making in that organization. Students formulate the problem, identify the right sources of data, analyze data, and prescribe actions to improve both the process of decision making and the outcomes resulting from those decisions. This project is delivered in four phases: a project proposal, a project outline, an in-class presentation, and a written report. Students may choose their own groups. Additional details about each step of the project are provided in class.
- Class Participation: Participation is measured by the ability of students to bring quality discussion into the class. This course is based on a model of active learning, with class discussions and activities playing an important role. Absence and lateness reduce the class participation grade, as will disruptive or unprofessional behavior.

Grading

The final grade is determined as follows:

- Individual assignments: 10% (5 assignments, 2% each)
- Team-based Class Activities: 12% (6 activities, 1-3% each)
- Mid-term exam: 25%
- Class participation: 3%
- Team-based course project: 25% (2% proposal, 35 outline, 6% presentation, 14% written report)
- Final exam: 25%

Readings

North, Matthew. *Data Mining for the Masses: With Implementations in RapidMiner and R*. 3rd ed. Scotts Valley, CA: CreateSpace Independent Publishing Platform, 2018.

Free pdf version available at:
https://docs.rapidminer.com/downloads/DataMiningForTheMasses.pdf.
The data sets used by the textbook are also available for free at:
https://sites.google.com/site/dataminingforthemasses/.

Additional Resources

Excel, including the Data Analysis add-in
RapidMiner, which is available for free at
https://my.rapidminer.com/nexus/account/index.html#downloads.
Tableau for visualizing data. A free student version is available at
https://www.tableau.com/academic/students.

In addition, occasional short readings will be provided via Canvas throughout the semester.

Outline of Course Content

Module 1: Introduction

- Course Introduction and Introduction to Analytics
- Excel Refresher; Obtaining Data
- Processing Data
- RapidMiner Tutorial
- Cleaning Data Sampling
- Summarizing Data Refresher
- Data and Probability

Module 2: Descriptive Analytics

- Multivariate Data Correlation
- Clustering
- k-Means Clustering
- Evaluating Cluster Results
- Other Clustering Methods
- Data Visualization
- Association Rules

Module 3: Forecasting

- Time Series Forecasting
- Moving Averages
- Exponential Smoothing
- Applying Forecasting Methods
- Regression refresher

Module 4: Predictive Analytics

- Intro to Predictive Analytics; Model Performance
- k-Nearest Neighbors
- Decision Trees
- Applying Predictive Methods
- Prediction vs. Classification
- Logistic Regression
- Applying Classification Methods
- Advanced Predictive Methods

Module 5: Presentations and Course Summary