ITM 683: Business Intelligence and Data Analytics

Instructor: Dan Port, Shidler College of Business

Course Overview

This course will explore the fundamental practices of analytics for acquiring business intelligence (BI). BI is used as input for human decisions or may drive fully automated decisions based on why some data pattern is observed, what will happen next, and how a firm can adapt to optimize that outcome. Merging developments in marketing and customer analytics with operations research, and aspects of information systems and desktop data analytics tools, the course offers a technical, quantitative program designed to hone your skill in turning data into business solutions and enable you to utilize prevalent analytics tools and methods.

Real business problems are messy and often poorly defined. The factors are generally uncertain and difficult to use for confident decision-making. BI provides practical and powerful ways to address real business problems universal in all areas of business be it management, accounting, finance, marketing, as well as MIS. Strong data analysis skills and confidence in business modeling, reporting, and decision-making under uncertainty is a key competitive advantage in today's data-driven business environment. This course will develop your confidence to seek out practical solutions to quantitative business modeling and decision problems using the abundance of available tools (such as Excel, R, and Rapid Miner) right on your laptop.

This is not a math, computer science, or data science course! The objective of this course is to become an "educated" participant in business analytics. You will workshop with practical business case studies for common business problems such as cost-benefit analysis, ROI, sales demand, resource allocation, forecasting, risk management, and employee assessment. You will have hands-on experience in developing and analyzing models, methods, and using tools for performing descriptive, predictive, and prescriptive analytics that can be used to address everyday business challenges. You will learn to effectively communicate with data scientists, data engineers, and professional data analytics consultants and understand how analytics provide insight into real-world business problems. You will experience using advanced data analytics concepts such as machine learning accessible and enable you to make use of the analytics tools currently available.

Topic Areas

- Data acquisition and manipulation
- Decision-making under uncertainty
- Regression: general linear model, logistic regression, robust regression
- Classification, discrimination, clustering
- Machine Learning: supervised, unsupervised
- Monte Carlo simulation
- Small-data analytics
- Big data visualization
- Dealing with dirty and missing data
- Data smoothing and modeling
- Structural equation modeling
- Linear and Non-linear optimization
- Text mining
- Network analysis
- Using popular analytics tools (e.g. R, Python, Tableau, Rapid-Miner)

The course culminates in a non-trivial unstructured real-world project of your choice making use of contemporary Data Analytics that you will put in your portfolio of business analytics experience.

Prerequisites

A course in business statistics such as BUS 619 or equivalent and a degree of comfort working with Excel. No programming or extensive quantitative/math background is required.

Grading:

Grading will be based on the completion of case study exercises and a real-world project. There are no exams. Students may select from a number of available projects or propose something of interest or relevance.

Tentative breakdown*

Exercises: 20%

Case Study Reports: 30%

Final Project: 30%

Class participation: 15%

Contemporary business analytics report: 5%

* breakdown will be adjusted to accommodate possible changes to the focus of the course

Course Outline**

All topics are explored through business-relevant case studies.

Module	Lecture, Case Study, Exercise
1. Introduction to Business Analytics	Exploring Business Analytics
2. Data and Decisions, Stats Review, Visual Analytics	Data Decisions Creating Visual Analytics Stats Review (as needed) Case 1: YMCA Hallowine Silent Auction
3. Introduction to R	Learning R Case 2: Late Night Happy Hour
4. Classification Analytics	Introduction to Classification Methods Case 3: GPA and GMAT for MBA Admissions
5. Clustering and Unsupervised Learning	Case 4: Classifying MBA Student Success Risk
6. Optimization Analytics	Case 5: MicroSlo Advertising and Unit Price
7. Monte Carlo Analytics	Case 6: MicroSlo Simulating Uncertain Demand
8. Stochastic Financial Analytics	Exercise: Bitcoin price and return simulation
9. Project Presentations	Project Workshop

** Course topics and sequence may be changed to accommodate pace, interest, and need

Textbook/References:

The textbooks are mainly used for references and there are free PDF versions available:

UC Business Analytics R Programming Guide*

http://uc-r.github.io/

*primary reference and tutorials

An Introduction to Statistical Learning with Applications in R

Gareth James, Daniela Witten, Trevor Hastie and Robert Tibshirani

ISBN-13: 978-1461471370

R in a Nutshell: A Desktop Quick Reference

Joseph Adler

ISBN-13: 978-1449312084

A general tutorial and excellent online resource is

UC Business Analytics R Programming Guide

http://uc-r.github.io/