

BHNR 343: ANALYTICAL DECISION MAKING
Engaged Learning, Writing Intensive, Honors
SPRING 2018; Mon/Wed/alt. Fri 1:40-2:30 in Corboy 201

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Office Hours:
Mon/Wed 2:30-4:30p
or by appointment

This is an Engaged Learning course, approved for the Undergraduate Research category, and thus satisfies the Loyola University Chicago Engaged Learning requirement. This section is also writing intensive.

Course Overview:

Today's business problems are too complex to rely solely on intuition and common sense, and the ability to make intelligent and informed decisions is critical for both managers and firms. This class introduces students to a collection of models that allow decision makers to analyze data, make decisions using data-driven models, and communicate those analyses and decisions to others.

This course will focus on the analysis of business data, and use both statistical and data mining methodologies to make evidence-based decisions. The applications of these techniques to business problems will be emphasized. Students in this course will acquire expertise in these computer-based methods for data analysis and decision-making that are commonly used in business analytics and data mining.

Students will conduct a team-based original data mining research project in any field of business administration, and create both a written analysis and oral presentation. The project will follow the CRISP data mining methodology. This includes formulating a problem with a business application, collecting and integrating business data from multiple sources, applying an appropriate data mining model, using the model results to build a strategy for the business problem, and evaluating the results of the model application on a validation set not used for building the model.

Learning to talk and write about data-driven research clearly and persuasively is a major focus of this class. You will be given the opportunity to write and then revise your writing as we move toward a finished research product. Wednesday assignments focus on reading and writing about research cases. Friday assignments are used to build your own research project.

Monday & Wednesday, class will be in-person. Fridays are reserved for group work, with in-person expectations on alternate weeks.

Book: optional: Research Methods for Business by Sekaran & Bougie, ISBN: 978-1-119-94225-2

Please note: This class may occasionally deviate from the course outline. The instructor reserves the right to make changes as needed to the course syllabus.

Course Objectives:

During this course, the student will:

- Study the basic data mining techniques;
- Learn the industry standard CRISP data mining procedure;
- Understand the type of problem for which each data mining technique is appropriate;
- Formulate a business problem in a data mining context;
- Collect and merge appropriate data sets and create insightful derived columns;
- Run, evaluate, and interpret a data mining model;
- Use the model results to recommend specific actions in a business environment;
- Create both written and oral presentations of their data mining results;
- Present the results at the undergraduate research symposium.

Grading Criteria:

Best 10 of Friday research project assignments (TA)	100 (10 points each)
Best 10 of Wednesday writing assignments on cases	100 (10 points each)
Individual Wednesday presentation(s) in class	20
Final research presentation in class	40
Final written research paper	80
Class participation	10
Presentation at the Undergraduate Research Symposium	20
Written reflection on engaged learning in Taskstream	20
Final Presentations	60
Total	450

Homework Assignments due Wednesday:

Each week, a research paper will be posted in Sakai. One person will be designated as lead presenter and one as lead critic. Each will give a short overview in class. The lead presenter should cover the case strong points with emphasis on the best of the writing style and presentation of the research story and results. The lead critic will cover the weak points with emphasis on the worst parts of the writing, research, and results.

All students will write a short criticism of the paper, as though they were a journal editor. Focus on both the strong and the weak points in the analysis and writing. Please print these out and submit them at the beginning of class on Wednesday.

Team Project and Presentations:

The project will serve as a practical learning experience in developing and delivering a research project in data mining & analytics. Students should be able to describe their data collection and manipulation, analysis process, and the potential benefits of expected findings. The grade will be based on the clarity, completeness, writing quality, demonstrated understanding and compelling delivery of the project and presentation. Each team member will be expected to participate equally.

Your final presentation should address at least each of the following issues: What question is driving the analysis? Why did you use this data set? How did you manipulate the original data? What technique(s) did you use for the analysis and why (how did they relate to your question)? What results did the technique give? What is the answer or action for the initial problem you addressed? How would you judge the effect of your solution if implemented?

Your report must include descriptions of: the problem, the data (source, field definitions, any calculated field descriptions, use in model), the selected model(s), analysis of model output, and application of the model results to the initial business problem. You must also include a description of the work done by each person in the group, and your rating (0 to 5) of their group contribution.

Loyola Engaged Learning Reflection: Please submit your completed reflection in Taskstream.

<http://luc.edu/engagedlearning/studentresources/engagedlearningassessment/>

Loyola University Chicago's mission statement: "We are Chicago's Jesuit Catholic university- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice, and faith."

Referencing Loyola's mission statement above, compose a written reflection (at least 2 pages, double-spaced) that connects your in-class and out-of-class experience responding to the following:

- *How did you connect your in-class and out-of-class Engaged Learning experiences?*
- *How did your Engaged Learning experience help you connect to the University's mission?*
- *How did the Engaged Learning experience in this course affect your personal, intellectual, civic, and/or professional development?*

Quinlan School of Business Policies:

Attendance: Class attendance and participation are fundamental components of learning, so punctual attendance at all classes, for the full class meeting period, is expected of Quinlan students.

Make-Up Work: A make-up final examination may be scheduled only with the permission of the Quinlan Assistant Dean. Late homework and in-class assignments are not accepted.

Academic Integrity: Plagiarism or cheating on the part of the student will result minimally in the instructor assigning the grade of "F" for the assignment or examination. For further information, consult the Quinlan School of Business Honor Code and Statement of Academic Integrity:

<http://www.luc.edu/media/lucedu/quinlanschoolofbusiness/pdfs/Honor-Code-Quinlan-July2012.pdf>

List of Topics to be covered:

Week 1		
17-Jan	Wednesday	Course Introduction
19-Jan	Friday	IN CLASS (Team Assignment 1) What is our question, what data can we use?
Week 2		
22-Jan	Monday	Modeler Introduction
24-Jan	Wednesday	(Case 1) A cluster analysis of service utilization and incarceration among homeless youth
26-Jan	Friday	(TA 2) Refine data set; join if necessary
Week 3		
29-Jan	Monday	Association Analysis
31-Jan	Wednesday	(Case 2) Market basket analysis of crash data from large jurisdictions and its potential as a decision support tool
2-Feb	Friday	IN CLASS (TA 3) Articles for Literature Review
Week 4		
5-Feb	Monday	Cluster Analysis
7-Feb	Wednesday	(Case 3) Hot Diggity Blog: A Cluster Analysis Examining Motivations and Other Factors for Why People Judge Different Types of Blogs as Credible
9-Feb	Friday	(TA 4) Introduction to your paper (motivation)
Week 5		
12-Feb	Monday	Decision Trees
14-Feb	Wednesday	(Case 4) Financial profiling of public hospitals: an application by data mining
16-Feb	Friday	IN CLASS (TA 5) Variables description; data sets defined; register for Symposium
Week 6		
19-Feb	Monday	Neural Networks
20-Feb	Wednesday	(Case 5) Neural Networks in Basketball Scouting
22-Feb	Friday	(TA 6) Rewrite of introduction, lit review, and data description
Week 7		
26-Feb	Monday	Support Vector Machines
28-Feb	Wednesday	(Case 6) Modeling wine preferences by data mining from physicochemical properties
2-Mar	Friday	(TA 7) Final model and results, install Tableau
Week 8		
5-Mar	Monday	Spring Break; no class
7-Mar	Wednesday	Spring Break; no class
9-Mar	Friday	Spring Break; no class
Week 9		
12-Mar	Monday	Tableau: Introduction, Data Import and Dashboard Walkthrough
14-Mar	Wednesday	(Case 7) Data Mining techniques for the detection of fraudulent financial statements
16-Mar	Friday	IN CLASS (TA 8) Complete Engaged Learning Reflection and post in Taskstream

Week 10		
19-Mar	Monday	Tableau: Working with Maps
21-Mar	Wednesday	(Case 8) Enhancing Simulation Models For Emergency Rooms Using VBA
23-Mar	Friday	(TA 9) Meaning, application, benefits, conclusion; that is, why what you found is important and how it can be used
Week 11		
26-Mar	Monday	Tableau: Product Drilldown
28-Mar	Wednesday	(Case 9) Childhood and Adolescent Television Viewing and Antisocial Behavior in Early Adulthood
30-Mar	Friday	IN CLASS (TA 10) Write abstract and recommendations for future research
Week 12		
2-Apr	Monday	Tableau: Social Media/Content Analysis
4-Apr	Wednesday	(Case 10) Probability-based surveying using self-sampling to estimate catch and effort in Norway's coastal tourist fishery
6-Apr	Friday	(TA 11) Prepare for in-class presentation of Symposium project
Week 13		
9-Apr	Monday	Symposium Presentations and Critique; final paper due
11-Apr	Wednesday	Symposium Presentations and Critique; final paper due
13-Apr	Friday	Easter Break
Week 14		
16-Apr	Monday	Easter Break
18-Apr	Wednesday	(Case 11) Income inequality, trust and homicide in 33 countries
20-Apr	Friday	Team Practice
21-Apr	Saturday	Weekend of Excellence!
Week 15		
23-Apr	Monday	New Data Set to Analyze
25-Apr	Wednesday	New Data Set to Analyze and New Case to Read
27-Apr	Friday	New Data Set to Analyze
Week 16		
3-May	Thursday	Final Exam 1 – 3