



**Department of Accounting, Operations and Information Systems**  
**OM710 Individual Research (Business Analytics)**  
**Winter 2018**

**Lectures:** Bus B18, Monday & Wednesday 11:00 AM – 12:20 PM

**Instructor:** Prof. ILBIN LEE, PhD

**Email:** [ilbin@ualberta.ca](mailto:ilbin@ualberta.ca)

**Office:** 2-29B

**Office hours:** Wed 12:30pm–1:30pm or by appointment

**Required Textbook:** *Essentials of Business Analytics*, 2nd Edition; Camm, Cochran, Fry, Ohlmann, Anderson, Sweeney, and Williams, 2016, South-Western College Pub.

Lecture notes are placed on the course web site (eClass) prior to topics being discussed in class. Note that the lecture notes are **not** an adequate substitute for class attendance.

**Software (available in the lab computers):**

- Microsoft Excel
- Microsoft Access
- R

**Course Objective:**

The goal of this course is twofold. The one is to provide an introduction to business analytics, which can be defined as the combined use of data analysis techniques and optimization models to make data-driven business decisions. The other goal is to provide a deeper understanding in selected topics in business analytics by reading related research articles. Because business analytics has applications in finance, marketing, and operations, the course covers examples and includes practical exercises in a variety of areas, such as:

- Finance – what is the best portfolio to invest, given the predicted risk of investment?
- Marketing – which customers should be targeted directly, given their predicted probability of responding to a certain advertisement?
- Operations – how to schedule appointments, given their no-show probability?

This course covers the 3 dimensions of business analytics:

- Descriptive analytics, which “uses data to figure out what happened in the past”
- Predictive analytics, which “uses data to find out what could happen in the future”
- Prescriptive analytics, which “uses data to prescribe the best course of action to increase the chances of realizing the best outcome”<sup>1</sup>.

**Topics:**

- Descriptive Analytics
  - Descriptive Statistics
  - Data Visualization
  - Relational Database and Basics of SQL
- Predictive Analytics: Data Mining

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<sup>1</sup> Robinson, A., J. Levis., G. Bennet. 2010. INFORMS News: INFORMS to Officially Join Analytics Movement. *OR/MS Today* 37(5) 59–62

- Classification Tree
- Clustering
- Prescriptive Analytics
  - Linear Optimization
  - Real-world examples

### **Evaluation:**

Students will participate every activity of OM420/620 offered in the same semester. In addition, each student will choose a topic of interest, read research papers related to the topic, and submit a report by the end of the semester.

- Assignments: 15%
  - 3 individual (i.e., not group) assignments. Each will count towards your final mark (i.e., no assignment is dropped).
  - No late assignment is accepted.
- Midterm: 20%
  - It is an open-book exam, tentatively on Feb. 28, 2018 (Wednesday).
- Final project: 35%
  - Teams of two or alone – Each student will discuss with the instructor and decide whether to team up with another student or do the project by him/herself. The decision will depend on the number of students in the course and also in the other sections (OM420 or OM620).
  - Project presentation is 10% (last weeks of class), project write-up 25% (due date)
  - More details will be given during the course. However, the project will consist of finding interesting information in a real-world data set and using this information to optimize decision making.
- Reading report: 30%
  - Each student will choose a topic covered in the lectures, find at least 5 research articles or book chapters related to the topic, and prepare a summary report of the literature review. Although not mandatory, the students are encouraged to arrange an oral presentation of their literature review in front of faculty members and other PhD students in the department.

### **Course Absence Policy:**

If a student is absent and is unable to complete the group project/exam within the given guidelines due to illness, the following procedures shall apply. In the case of group work, no extension will be provided to the group unless there are indications that all group members were incapacitated by illness. If the mid-term exam is missed, no alternate exam will be available; instead, a half of the weight of the mid-term will be assigned to the group project and the other half to the assignments.

### **Web Site General Information:**

The address of the web site is <https://eclass.srv.ualberta.ca/>

You can access the course web site with your CCID and password. Please contact IST(780-492-9400) or the [helpdesk@ualberta.ca](mailto:helpdesk@ualberta.ca) for assistance if you do not have your CCID or password.

### **Accommodating Disabilities:**

Students who require accommodations in this course due to a disability affecting mobility, vision, hearing, learning, or mental or physical health are advised to discuss their needs with Specialized Support

and Disability Services, 2-800 Students' Union Building, 492-3381 (phone) or 492-7269 (TTY) and to contact me as soon as possible so that we can discuss appropriate arrangements.

**Academic misconduct:**

Students who commit any act of plagiarism, cheating, or misrepresentation in this course will be penalized. All assignments (except for the group project) are to be completed individually. However, I recognize the value of studying together and comparing notes when working on assignments. To help you judge what I consider acceptable and non-acceptable collaboration, consider the following.

**Do:**

- Discuss the course material with other students
- Ask classmates for help when you are stumped
- Offer help to other students
- Do your own work.

**Don't:**

- Discuss numerical answers with other students
- Use someone else's words without proper attribution
  - The best way to avoid using another student's words is to never look at another student's written answers to an assignment
  - If you cite an article, book, web page, or any other source in your project report, then you must include complete information about that source
- Copy another student's spreadsheet file, sql file, or any other computer file
  - There are no exceptions to this rule. Copying another student's file for an assignment (or another group's work, for the group project) is not acceptable, under any circumstances. It is irrelevant whether the copying is done electronically or manually

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at [www.ualberta.ca/secretariat/appeals.htm](http://www.ualberta.ca/secretariat/appeals.htm)) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.

Academic dishonesty in this course will be prosecuted severely. See the Frequently Asked Questions (on course web) for some guidelines on what we consider acceptable and unacceptable behaviour.

Policy about course outlines can be found in §23.4(2) of the University Calendar.

## TENTATIVE SCHEDULE

Note: This is a general guideline for the semester. To accommodate student interests we may find it necessary to make alterations to the schedule as the semester progresses. Topics will be covered in sequence; however, it may be necessary to go faster or slower than indicated.

| <b>Date</b> | <b>Topic</b>  | <b>Due Dates</b>   |
|-------------|---|--|
| Jan 8       | Lecture 1 Introduction                                |  |
| Jan 10      | Lecture 2 Descriptive statistics                      |  |
| Jan 15      | Lecture 3 Data Visualization Part 1                   |  |
| Jan 17      | Lecture 3 Data Visualization Part 2                   |  |
| Jan 22      | Lecture 4 Database Basics and Microsoft Access Part 1 |  |
| Jan 24      | Lecture 4 Database Basics and Microsoft Access Part 2 |  |
| Jan 29      | Lecture 5 Basics in SQL Part 1                        |  |
| Jan 31      | Lecture 5 Basics in SQL Part 2                        | HW1 due: Jan 31 11:59pm  |
| Feb 5       | Lecture 6 Data Mining Part 1                          |  |
| Feb 7       | Lecture 6 Data Mining Part 2                          |  |
| Feb 12      | Lecture 7 Classification with Decision Trees Part 1   |  |
| Feb 14      | Lecture 7 Classification with Decision Trees Part 2   |  |
| Feb 19      | Holiday   |  |
| Feb 21      | Reading week  |  |
| Feb 26      | Review for Midterm                                    |  |
| Feb 28      | Midterm Exam  |  |
| Mar 5       | Midterm Feedback (til noon, students' union election) |  |
| Mar 7       | Lecture 7 Classification with Decision Trees Part 3   | HW2 due: Mar 7 11:59pm   |
| Mar 12      | Lecture 7 Classification with Decision Trees Part 4   |  |
| Mar 14      | Lecture 8 Clustering Part 1                           |  |
| Mar 19      | Lecture 8 Clustering Part 2                           |  |
| Mar 21      | Lecture 9 Association Rule                            |  |
| Mar 26      | Lecture 10 Linear Optimization Part 1                 |  |
| Mar 28      | Lecture 10 Linear Optimization Part 2                 |  |
| Apr 2       | Easter Monday, holiday                                |  |
| Apr 4       | Q&A Session for Final Project                         | HW3 due: Apr 4 11:59pm   |
| Apr 9       | Student Group Project Presentations                   |  |
| Apr 11      | Student Group Project Presentations                   |  |
|             |   | Project Write-up Apr 15<br>11:59pm<br>Reading report due Apr 15<br>11:59pm |