

Syllabus

Fall 2018 Semester

Instructor: Professor Barry Keating
Office: 226 Mendoza
 1:00 - 2:50 TR

Class meets in Room **L068 Mendoza**

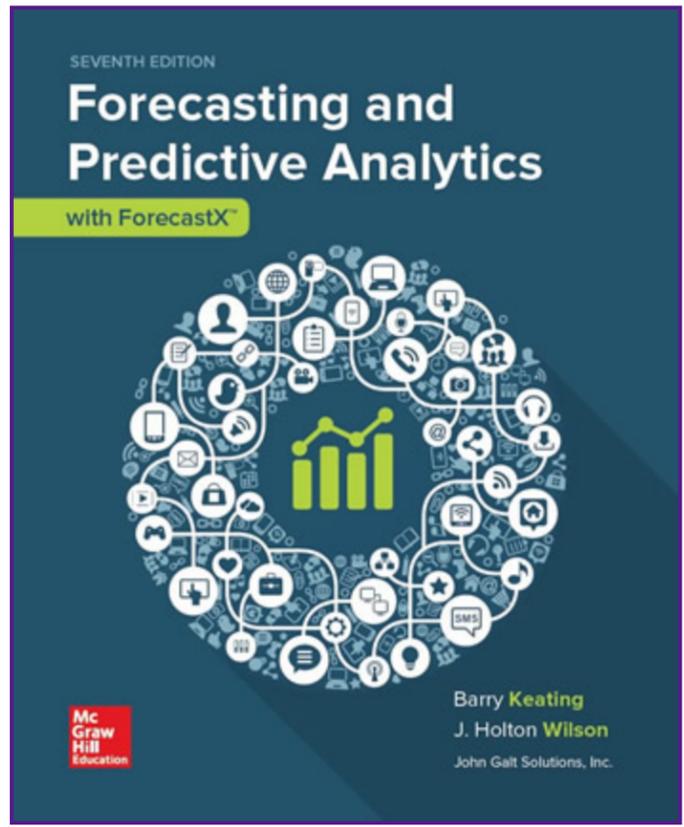
Office Hours: 11:00 - 12:00 TR

Forecasting and Predictive Analytics

(FIN 70230)

Fall 2018

[Jump to Assignment Sheet directly.](#)



Four items are needed for this course:

- 1) **Textbook Access:** Barry Keating and J. Holton Wilson. **Forecasting and Predictive Analytics, *Seventh Edition***. The book will be accessed through your [CONNECT](#) account from McGraw-Hill. Note: **Do NOT purchase the hardcopy of the text!** This class will use McGraw-Hill's **CONNECT (LearnSmart)** learning software to access an enhanced digital version of the textbook and accompanying materials.
- 2) **ForecastX For Excel** (statistical software **downloaded with instructions emailed to you** and also available in the Mendoza labs); this software is compatible with Windows 7, Windows 10 and Office 2016. This software will be made available for download to registered students. This software is only available for Windows. While not available for Macintosh computers, this software is available on all Mendoza College machines.
- 3) **XLMiner** (not available on any college machines or servers). This software is **available for download to registered students for a fee**. This software is only available for Windows (but may be accessed through a browser for Macintosh users)..
- 4) **Prevedere** (accessed through a browser). The Prevedere access will be **available directly to registered students**.

Other software we will use is available on College servers: **IBM/SPSS Modeler** and **SAS Enterprise Miner**; these commercial packages are not available for student download.

Apps are available for IOS and Android for **LearnSmart**, **SmartBook**, and **ReadAnywhere**. These Apps will allow you to access course materials from any location using a variety of devices. After downloading the Apps, link them to your **CONNECT** account and this class section.



*"I believe that forecasting or demand management may have the potential to add more value to a business than any single activity within the supply chain. I say this because **if you can get the forecast right, you have the potential to get everything else in the supply chain right**. But if you can't get the forecast right, then everything else you do essentially will be reactive, as opposed to proactive planning."*

Al Enns, Director of Supply Chain Strategies, Motts North America, Stamford, Connecticut

We might think of business prediction as having developed in three stages. One way of looking at this development is illustrated in the figure below. Almost anything you think about has gone through some evolution. In lighting, we went from primitive torches to kerosene to the first light bulbs developed by Edison in the late 1870s. Incandescent light bulbs like the one at the left in the figure became a worldwide standard for many years. Such light bulbs had a relatively short life, were hot, and were not energy efficient. In the late 20th century, new, more energy-efficient, longer lasting, but still hot compact flourescent bulbs became common. Then, in the early 21st century, LED bulbs that were cool, energy efficient, and long-lasting became the new norm.

The Three Stages of Prediction Evolution



Forecasting has gone through an evolution as well. The oldest of the predictive models, time series models, are covered at the beginning of the course (Stage I). The second stage of the course moves into causal demand planning models (Stage II). But the emergence of "**Big Data**" has brought with it an increased need for additional analytical tools; these analytics tools will comprise the last half of the course. Today every organization is confronted with a deluge of data. Organizations have more data than can easily be converted into actionable information using traditional statistical methods. This is "Stage III" in the evolution of forecasting and predictive analytics.

The single goal of this course is to enable you to "**turn data into information.**" Data is simply numbers, text, audio, and graphics; data is just facts and figures. Information, however, is data that is processed, organized, structured or presented in context so as to make it useful for informing decisions.

There is a certification process available to forecasters much like the Certified Financial Analyst designation or the Certified Public Accountant designation. The Certified Professional Forecaster designation is available through the [Institute of Business Forecasting](#).

Course Learning Objectives:

If you stay engaged in the course and complete the suggested readings in *SmartBook* and *LearnSmart* and the assignments in [CONNECT](#):

- You will be able to think systematically about how big data is used to make business decisions. This objective will be accomplished through the use of a forecasting and predictive analytics framework, which relies on ideas and/or tools from statistics, economics, and computer technology.
- You will be able to identify relevant information to support model selection in scenarios where issues of time series analysis, demand planning, and data mining are involved. Particular emphasis will be placed on using actual data drawn from operating businesses.
- You will develop a better understanding of the usefulness of using data from outside the individual firm. This objective will be implemented by using a "data consolidator" in the cloud that gives access to you to millions of data series. You will also learn to use the tools that will help determine which of these series may be of use in particular instances.
- You will improve your ability to explain and present analytics models and their results. You will be able to explain measures of fit and accuracy for each of the models you master. Daily presentation of homework problems and short cases will aid in accomplishing this goal.
- You will further your understanding of statistical and analytics tools and be able to incorporate them in both commercial analytics packages such as SPSS Modeler as well as in Microsoft Excel add-ins that are used exclusively for pedagogical purposes.
- **You will acquire the skill of "turning data into information!"**

Attendance:

Regular attendance is essential to the successful completion of this course. Attendance will regularly be taken and you are responsible for material covered in class whether or not you have attended class. Missing more than four class sessions unexcused will result in an automatic reduction in course grade. You should plan on spending at least two hours of independent study in **CONNECT** for each hour of class attendance.

Grading:

A course grade will be assigned on the basis of student performance on a midterm examination, a final examination, and assignments. The assignments and textbook problem solutions will sometimes be presented in class by students.

Assignments and Problems (completed in **CONNECT**): thirty percent of the course grade

Midterm Exam : twenty five percent of the course grade

Final (comprehensive) Exam : forty five percent of the course grade

Gradebook available in Sakai.

Assignments and Problems:

On the attached "assignment sheet" you will find a class-by-class list of topics to be covered and your reading assignment. Reading assignments in the **CONNECT** textbook are to be completed on the due dates. Exercise/problem assignments are most commonly handed in through **CONNECT**.

Assignments (essentially longer problems, directed exercises, or reviews of articles presented in class) will be assigned for some of the topics covered and will be discussed by students in class. The class presentation of assignments and textbook problems (using your computer) is an important and integral part of the course.

Note that all the data sets for the figures, tables, and exercises in the textbook are available in the "**Library**" section of **CONNECT** (often in Excel format). There is no need for you to "key in" any of the data sets used in the course.

In the "**Library**" section of **CONNECT** there are short videos that detail how to implement the various procedures we will use in software.

Honor Code:

The **University of Notre Dame Graduate Academic Code of Honor** is observed in this class. Violation of the Code of Honor consists of misrepresenting, in any way, anyone else's work as your own, any verbal or written misrepresentations to the instructor, any use of unauthorized external materials during quizzes and/or tests, or any collaborative effort on the examinations. All members of the class have an equal and shared responsibility to enforce the code of ethics among their peers.

Midterm Examinations:

The examinations will be full-period examinations of essentially a problem-solving nature; problems and questions will be similar to those asked of you in **CONNECT**. Because of the technical nature of the examination, students are allowed to use calculators (**not a smartphone calculator!**). The examination, however, is to be completed without reference to the textbook, class notes or any other materials. Grades for these examinations will be available in Sakai. Completed examinations will be returned to students after grading.

Final Comprehensive Examination:

A comprehensive final examination will be administered during the "final examination period" of the university at the Registrar's selected time and date. The final examination grade will be available in Sakai.

The Project:

Note: This semester undergraduate students will not have a semester-long project!

Missing Assignments:

Assignments or problems should be handed in through **CONNECT** on the due date (or when the instructor indicates, as adjustments are made through the semester). Assignments not handed in on the due date will receive a grade of zero. Some problems and exercises will be presented in class by students. Handing in a solution on **CONNECT** does not substitute for a presentation and explanation when called upon.

Assignment Sheet

Class# /Date /Topic Assignment

This course meets every Tuesday and Thursday.

1 8/21 (Tuesday) Introduction to Business Forecasting, -- Chapter 1 Introduction to Forecasting and Predictive Analytics

- Overview of the ForecastXTM computing package
- Overview of the XLMinerTM computing package
- Overview of PrevedereTM
- Using [CONNECT](#) (for reading, studying, practice quizzes and exams, assignments, and grading)

2 8/23 (Thursday) Continued -- Chapter 2 -- The Forecast Process, Data Considerations, and Model Selection and

Chapter 3 -- Extrapolation 1. Moving Averages and Exponential Smoothing

3 8/28 (Tuesday) Chapter 4 -- Extrapolation 2. Introduction to Forecasting with Regression Trend Models

4 8/30 (Thursday) Chapter 5 --Explanatory Models 1. Forecasting with Multiple Regression Causal Models

5 9/4 (Tuesday) Chapter 5 --Explanatory Models 1. Forecasting with Multiple Regression Causal Models (continued)

6 9/6 (Thursday) Chapter 6 -- Explanatory Models 2. Time-Series Decomposition

7 9/11 (Tuesday) Chapter 7 -- Explanatory Models 3. ARIMA (Box-Jenkins) Forecasting Models

8 9/13 (Thursday) **Midterm Examination**

9 9/18 (Tuesday) Chapter 8 -- Predictive Analytics: Helping to Make Sense of Big Data

10 9/20 (Thursday) Chapter 9 -- Classification Models: The Most Used Models in Analytics

11 9/25 (Tuesday) Chapter 10 -- Ensemble Models and Clustering

12 9/27 (Thursday) Chapter 11 -- Text Mining

13 10/2 (Tuesday) Chapter 11 -- Text Mining

Final Examination for Forecasting & Predictive Analytics (FIN 70230):

October 5, 2018 (assigned by Registrar)

Location: L068

Time: TBD
