

University of Notre Dame
Accounting 70281 – Spring 2021
Data Analytics in Accounting

I. Professor

Professor: Jeff Burks

Office Location: Mendoza 385

Office Hours: Most any time by advanced notice, or drop in Wednesdays 5:15-6:15 pm or Fridays 10:30-11:30 am

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II. Course Materials

Text: Business Analytics: Data Analysis and Decision Making, Albright and Winston. 5th Edition, Cengage Learning, 2015.

Purchase, rent, and ebook options are available. The official publisher website is www.cengagebrain.com/shop/isbn/9781133629603 but there may be cheaper options elsewhere online and perhaps at the bookstore.

Note: The purchase, rent, and ebook options allow you to download a student version of the Palisade DecisionTools Suite to your own PC. This software is crucial for the course. However, the student version is not powerful enough for some course assignments, and Apple computers have had difficulty running the student version. The fully functional Palisade software can be accessed at ND computer labs either in-person or remotely. For instructions on downloading the student version, see "Downloading Palisades.doc" under the Session 1 folder on Sakai.

Remote Access to computers. Remote access means using your own computer to access another computer. The screen of the other computer becomes the screen you see on your own computer. Outside of class, you may find it useful to remotely access Excel (for example, if you have an Apple computer) and other tools such as @Risk and Power Query. There are two ways to do this, depending on which tool you are trying to access:

- The best way to access basic Excel and Power Query is described here:
<https://notredame.app.box.com/v/RemoteLabSetup>.
- The *only* way to access PrecisionTree and @Risk is described here:
<https://notredame.app.box.com/v/Virtual-Computer-Lab-Stats>.

This method also provides access to basic Excel and Power Query, but this type of remote access tends to be slower than the first method. You may need to wait around 5 minutes to gain access.

With either method, it is extremely important to save your work to your Google Drive so that it is not lost when you exit the remote computer.

Library Reserves: Supplementary articles and readings are available electronically through the Library Reserves tool in Sakai (sakai.nd.edu) for the SP21-ACCT-70281 course. These readings serve as the basis for quizzes and classroom discussion or exercises.

Recommended:

Subscription to *The Wall Street Journal*. Student subscriptions can be usually be purchased for around \$24, which includes print, online, and mobile for a year. Google “Wall Street Journal student”.

III. Course Learning Objectives

- Students will be able to think systematically about difficult managerial decisions, using ideas and/or analytical tools from statistics, economics, and cognitive psychology. (MSA learning goal: Problem Solving)
- Students will be able to identify relevant information to support decisions that involve uncertainty and risk. This course focuses on how analytics can be used to support decisions in accounting and business. (MSA learning goal: Problem Solving)
- Students will learn how to conduct statistical and mathematical analyses using Microsoft Excel, Tableau, and available add-ins. (MSA learning goal: Problem Solving)
- Students will develop a better understanding of the decision-usefulness of accounting measures. (MSA learning goal: Problem Solving)
- Students will be able to understand and evaluate valuation models. (MSA learning goal: Problem Solving)
- Students will consider the ethical dimensions of business decisions and the role of technology, information, and empiricism in human development. (MSA learning goal: Ethics/Professionalism)
- Students will improve their oral and written communication skills. This is accomplished through daily participation and several assignments that require them to analyze or research questions and provide written feedback. (MSA learning goal: Communication)

IV. Pre-Requisites

Students should be familiar with basic concepts of probability and statistics and with basic use of Microsoft Excel.

V. Grading

Your grade will be determined based on your total score on the following items:

| | |
|--|------------|
| Major Assignments (4) | 160 |
| Minor Assignments (2) | 30 |
| Midterm Examination | 120 |
| Final Examination | 180 |
| Participation/Attendance/Professionalism | 50 |
| Quizzes* | <u>100</u> |
| TOTAL POINTS | 640 |

* For convenience, each quiz question generally will be assigned a face value of 10 points. However, this is not the real value of each quiz question because the sum of all the face value points across all quizzes is much larger than 100. To compute your overall course grade, the *percentage* of face value points you earn will be multiplied by 100. At the end of the semester, each student's **three** lowest quiz scores will be dropped.¹

Final grades will be set to achieve an average GPA between 3.3 and 3.6, consistent with Accountancy Department requirements.

VI. Course Organization & Administration

Preparation and daily effort. Read, think about, and prepare to discuss the assigned readings before class. It is also a good idea to read, think about, and even attempt the problems before class. This exposure to the material will help you follow the lecture, participate in discussion, improve your long-term retention of the material, and reduce preparation time and effort for exams.

Most every **article reading** has a quiz on Sakai that must be completed *before* class (due by 10:45 AM on the day of class). Make sure to read the article thoroughly before logging into the Sakai quiz because most Sakai quizzes have a time limit of 5 minutes once you log in. Quizzes over articles are *individual* (not group) tasks.

Most classes have a **homework problem** that must be completed *after* class. Once you complete the problem (usually in Excel), submit your answers by taking the multiple-choice quiz associated with that problem on Sakai (due by 10:45 AM on the *next* class day). Make sure to complete the problem before logging into the Sakai quiz because most Sakai quizzes have a time limit of 5 minutes once you log in. You may work on the problems with up to two classmates, but the work must be truly collaborative and not just one person free-riding on another. *Furthermore, the*

¹ Most quizzes have 3 questions, making them worth 30 face value points. A few quizzes are worth more than 30 face value points. Dropping these quizzes uses up more than one drop. For example, dropping a 60-point quiz uses up two drops.

quizzes themselves must be taken individually. In other words, once one person has logged into the quiz, no collaboration or communication about the problem or quiz is allowed until all collaborators have taken the quiz.

Attendance, Participation, and Professionalism. 50 course points are allocated to attendance, participation, and professionalism. Students are expected to attend every class, and to do so in-person unless receiving a yellow or red pass. Please send an email to me prior to any class that you cannot attend.

Part of professionalism is arriving to class on time and being attentive to what we are doing in class. Just as coming in late disrupts class, so does leaving during class for a “break.” Please be considerate of your classmates during instructional time and leave the room only in the rare event of a personal emergency. Most every class session will have a 5 minute break in the middle.

Phones and other electronic devices must be **stowed away** during class (in a bag, coat, etc). *They may not be kept on the desk, keyboard tray, etc.* Similarly, on the classroom computers you may not browse the web or work on things unrelated to class.

Participation. It is important to develop the ability to form and respond to questions in the presence of peers. Students who receive high participation grades prepare well, demonstrate logical thinking, and make meaningful comments during class. Students who receive low participation grades come to class unprepared, make few comments, and do not respond when called upon.

Processes. The course is organized around two 105-minute sessions per week which will consist of lecture, demonstration of applications, and discussion of assigned readings, problems, and cases.

Sakai will be used extensively in this course, which can be accessed at sakai.nd.edu. Students registered for the course will be able to access Excel files, supplementary readings, quizzes, and parts of exams through this tool.

Exams. There will be one midterm based on the material covered in sessions 1-5, and one final exam largely based on the material covered in sessions 7-13.

VII. Honor Code

You are responsible to uphold the Mendoza College of Business Graduate Academic Honor Code (see [Academic and Honor Codes](#)). Perhaps the most fundamental sentence is the beginning of section 4.2:

“The pledge to uphold the Honor Code includes an understanding that a student’s submitted work (examinations, draft copies, papers, homework assignments, etc.) must be his or her own.”

Materials and answers related to exams, quizzes, and assignments from prior semesters or the undergraduate course may not be used by students in the current semester.

Using live class recordings and other course materials

If class meetings are recorded, the University strictly prohibits anyone from duplicating, downloading, or sharing live class recordings with anyone outside of this course, for any reason. The same goes for all other course materials.

VIII. Course Schedule

A course schedule follows. Quizzes and assignments must be turned in via Sakai by **10:45 am** on the day listed. Quizzes and assignments are listed in two columns on the following schedule: the 4th column and last column.

Other

Weekday Masses at convenient locations

- 8:00 am, usually less than 30 minutes, Stinson-Remick chapel (across the quad from Mendoza)
- 11:30 am and 5:15 pm, usually 35-40 minutes, Basilica of the Sacred Heart (Sacrament of Reconciliation is offered in the 30 minutes before Mass)
- 12:05 pm, usually less than 30 minutes, St. Matthew’s Chapel in the Stayer Center (next to Mendoza)

Support for students facing planned or unplanned pregnancy: Notre Dame is committed to providing pregnant students with caring and non-judgmental [professional assistance and support](#). If you or someone you know could use this support, I would be happy to listen, help, or connect you with University support.

| Session | Date | Topic | Readings and Reading Quizzes Due (all non-textbook readings are in Library Reserves unless stated otherwise) | In-class Problems | Problem Quizzes Due and Other Homework |
|---------|------|--|---|--|--|
| 1 | 2-2 | Introduction | Chapter 2 (p 66-70) – Filter | Adaptation of P2-35 | |
| 2 | 2-4 | Structuring data: Cleaning, Pivot tables, Filters, and Merging | Chapter 3 (p 108-117) – Pivot Tables Using Excel to Ferret Out Fraud (Quiz) | Vendor file.xls Employee_deposits.xls Accounts Receivable Audit.xls, parts 1 and 2 | |
| 3 | 2-9 | Technology, Information, and Catholic Social Teaching Structuring data: Cleaning, Pivot Tables, Filters, and Merging | <p>1. Introduction—Against the gods</p> <p>2. Technology, Information, and Catholic Social Teaching (found in Session 2 folder on Sakai)</p> <p>3. An IMA member Shares His XBRL Filing Experience (Quiz) (also briefly consult https://www.xbrl.org/ for background on XBRL if needed)</p> <p><i>Take combined essay quiz over readings #1 and #2 prior to class (go to Sakai Tests and Quizzes). Because of the effort involved relative to a normal quiz, this quiz will be double-weighted.</i></p> <p>Writing prompt: Write two paragraphs comparing and contrasting the views expressed in the "Against the gods" reading with those expressed in the reading on Catholic Social Teaching. You might focus on the themes of technology, information, empiricism, man's relationship with nature, or human development. Do not try to cover all of the themes. Focus on a couple of particular points of similarity or difference.</p> | Accounts Receivable Audit.xls, part 3 XBRL data.xls | <p>Student Data Sheet (see Tests and Quizzes in Sakai)</p> <p>P2-37 (p 71) <i>Filter in place and mark records with 1's as shown in class. The data file for the problem can be found in the Session 1 folder.</i></p> <p>Start House Limit individual assignment (Sakai Assignments)</p> |

| Session | Date | Topic | Readings and Reading Quizzes Due (all non-textbook readings are in Library Reserves unless stated otherwise) | In-class Problems | Problem Quizzes Due and Other Homework |
|----------------|-------------|---|--|---|---|
| 4 | 2-11 | Decision Trees – The Value of Information | Chapter 6 (p 222-232, 239-245) - Decision Trees Chapter 6 (p 252-255)-Bayes Rule Chapter 6 (p 256-266)-Information Value | Auto Insurance.xls Landowner.xls | Register on Tableau website (http://www.tableau.com/academic/students) in preparation for Session 5. Start Value of Information assignment (Sakai Assignments) |

| Session | Date | Topic | Readings and Reading Quizzes Due (all non-textbook readings are in Library Reserves unless stated otherwise) | In-class Problems | Problem Quizzes Due and Other Homework |
|---------|------|--|---|--|--|
| 5 | 2-16 | Data Visualization: Tableau and conditional formatting in Excel Power Query | <p>Before class:</p> <ol style="list-style-type: none"> 1. Register on Tableau website (http://www.tableau.com/academic/students). 2. Watch the 25-minute “Getting Started” video (under Learning – Free Training Videos – Getting Started). You can just watch carefully; you do not have to do the steps yourself. 3. Re-familiarize yourself with the solution files for Employee_Deposits.xls (parts 1 and 2) and Accounts Receivable Audit.xls (part 3). The solution files can be found in the Session 2 and 3 folders. We will use Tableau to redo these parts in class. | Employee_Deposits.xls Accounts Receivable Audit.xls | House Limit individual assignment (Sakai Assignments) Television Network (Session 7) <i>No Sakai quiz over this. Instead do it to help prepare for “Bayes Rule” quiz.</i> Bayes’ Rule Quiz (worth 3X a normal quiz, 25 minute time limit, open book/note) <i>When you open the quiz you will see a scenario similar to the “Landowner” and “Television Network” cases. For this scenario, use Bayes Rule to derive the probabilities needed for a “Value of Information” decision tree. Ignore the “username” and “password” on the first screen.</i> Start House Limit Using Power Query minor assignment (Sakai Assignments) Start Fixed Asset Reconciliation assignment (Sakai Assignments) |
| 6 | 2-18 | Midterm exam | Covers Sessions 1-4. No Tableau. | | |

| Session | Date | Topic | Readings and Reading Quizzes Due (all non-textbook readings are in Library Reserves unless stated otherwise) | In-class Problems | Problem Quizzes Due and Other Homework |
|---------|------|---|--|--|---|
| 7 | 2-23 | Hypothesis Testing | Chapter 5 (p 168-172, 174) - Normal Distribution Chapter 9 (p 401-411) - Hypothesis Testing | P5-9 (p 188) Commute Time Accounts Receivable Audit.xls, Part 5 (Note: Part 4 is not covered as part of this course) | House Limit Using Power Query minor assignment (Sakai Assignments) |
| 8 | 2-25 | Linear Relationships and Regression | Chapter 3 (p. 101-105) –Correlation and covariance Chapter 10 (p 463-468, 476-481, 484-485) - Regression Chapter 10 (p 487-490, 494-501) -Control for other variables Chapter 11 (p 534-542) – Inferences about regression coefficients Freakonomics (Quiz) | House.xls P60 Adaptation.xls | Problem 9-3 (p 417) <i>Get data in Session 7 folder.</i> Value of Information assignment (Sakai Assignments) |
| 9 | 3-2 | Mini-break day | No class | | |
| 10 | 3-4 | Regression application: Role of Accruals in Predicting Cash Flows | Barth, Cram, and Nelson (2001), p. 27-36, 41-43 (Quiz) Note: This is a challenging reading. It will be explained in class over the next 2-3 class periods. Treat the reading as an opportunity to get some preliminary exposure to the model before it is explained in class. | Accruals_template.xls | Problem 10-27 (p. 518) <i>Get data in Session 8 folder. Do parts a through f but ignore the questions about "accuracy" in parts e and f.</i> |

| Session | Date | Topic | Readings and Reading Quizzes Due (all non-textbook readings are in Library Reserves unless stated otherwise) | In-class Problems | Problem Quizzes Due and Other Homework |
|---------|------|---|---|---|--|
| 11 | 3-9 | Regression application: Role of Accruals in Predicting Cash Flows Option Valuation Models: Black-Scholes | The Quants Run Wall Street Now Quantitative Investing: A Crisis Waiting to Happen <i>Take combined quiz over the two articles.</i> How to “Excel” at Options Valuation (Quiz) | OptionValuationMethods.xls | Fixed Asset Reconciliation assignment (Sakai Assignments) Start Fixed Asset Reconciliation Using Power Query minor assignment (Sakai Assignments) Start Regression and Depreciation assignment (Sakai Assignments) |
| 12 | 3-11 | Option Valuation Models: Lattice and Monte Carlo | Chapter 15 (p 812-832) – Distributions | OptionValuationMethods.xls Sample Distributions.xls OptionValuationMethods-Amazon.xls | Fixed Asset Reconciliation Using Power Query minor assignment (Sakai Assignments) <i>Due Friday, 3/12 5:00 pm.</i> |
| 13 | 3-16 | Simulation and @Risk Simulating the Central Limit Theorem | Public Pension Deficits are Worse than You Think (Quiz) Odds-On Imperfection (Quiz) Mindle 3: Combinations of Uncertain Numbers (Quiz) | Public Pension Deficits.xls Your Financial Plan.xls CentLimT2.xls Extra practice: P16-41 (p 936) Quantitative Investing.xls | Regression and Depreciation assignment (Sakai Assignments) Option Valuation.xls (do your work in the spreadsheet found in the Session 12 folder before clicking the quiz link) |
| | | Final Exam | Mostly covers sessions 7 through 13, although you should be familiar with pivot tables, vlookups, and advanced filters. Decision tree material will pertain only to the lattice option model (no “value of information”). No Tableau. | | |