

University of Cincinnati College of Business
Department of Quantitative Analysis and Operations Management
QA 711: Statistics and Decision Models for Managers – Fall Quarter 2009

Syllabus

Instructor: Dr. W. David Kelton, Professor of Quantitative Analysis and MSQA Program Director
david.kelton@uc.edu, 525 Lindner Hall, 513-556-6834, <http://www.cba.uc.edu/faculty/keltonwd/>
Office hours: Mondays 4:00-6:00pm, after each class, by appointment, and ongoing by e-mail (please set your e-mail account or client to copy back prior messages when replying or forwarding)

Website: <http://blackboard.uc.edu/>. Use your UC login and password to access, then select QA 711 under My Courses in the upper right. Check frequently for announcements, material, and updates.

Catalog description: 4 graduate credits. Introduction to statistical and probabilistic analysis with focus on practical decisions and risk using quantitative models and Microsoft Excel. Topics include descriptive and graphical statistical methods, sampling and sampling distributions, estimation, hypothesis testing, analysis of variance, regression, decision modeling, and simulation. Assumes prior basic knowledge of Excel.¹

Objectives: By the end of the course, you should be able to use the topics in the catalog description to:

- Find, extract, organize, and describe data to support business decisions
- Identify and quantify relationships between variables
- Develop spreadsheet models to analyze data, evaluate alternative decisions, and evaluate risk
- Present and evaluate courses of action
- Become a “power user” of Excel and of the commercial Palisade add-ins for analysis

This is a “to-do” course, and you must actively engage in the outside class work. The methods and skills apply across all areas of business, as is increasingly being recognized under rubrics such as *business analytics* and *business intelligence*.

Class meetings: Mondays, 6:00-9:30pm, 110 Lindner Hall.

- Class attendance is essential for you to learn this material; let me know in advance if you must miss a class, and why, so I can help make sure you stay on track.
 - You *must* be in attendance on **Mon. Nov. 2** (mid-term exam, 6:00-9:30pm [note that Daylight Savings Time ends Sun. Nov. 1]) and **Mon. Dec. 7** (final exam, 6:00-9:30pm).
- Laptop use will be allowed in class, but *only* for taking notes and following along in the class notes and software – *please, no* web surfing, e-mailing, instant-messaging, etc., as such is very distracting to those around you, to me (believe me, I *know* when you’re doing it), and (obviously) to you. *If I receive information or complaints that this policy is being violated I regret that I will be forced to ban laptops from class.*
- Obviously, turn *off* all cell phones, Blackberries, etc. ... just putting on vibrate is not enough (search YouTube for “cell phone in class”).

¹ Creating Excel “=” formulas in cells that refer to values in other cells, and the arithmetic operations (+, -, *, /, ^) and the order in which they’re executed (and using parentheses to control order of execution); Copying formulas down and across; Relative and absolute (\$) cell references in formulas (in relation to copying down/across); Formatting cells (height/width, fill color, text font/color/size); Inserting text boxes; Inserting and working with Excel charts/graphs; Looking for and using built-in Excel functions (organized by topic, a few examples are MIN, MAX, COUNT, COUNTA, COUNTIF, AVERAGE, SUM, STDEV); Data ranges (defining, naming, using). If you are unfamiliar with this, you need to work through the Excel tutorial on the CD provided with the book.

Materials:

- *Data Analysis & Decision Making with Microsoft Excel, Revised* 3rd edition, by S. Christian Albright, Wayne L. Winston, and Christopher J. Zappe, published by South-Western Cengage Learning, 2009.
 - Earlier editions (2nd or 1st) are not adequate.
 - Actually, there are *two different* 3rd editions — the original "unrevised" 3rd edition (copyright 2006), and a Revised 3rd edition (copyright 2009).
 - The only difference is that the 2006 unrevised version uses Excel 2003, and the 2009 Revised version uses Excel 2007. As you may know, there's a big difference between Excel 2007 and all earlier versions, at least in terms of the user interface.
 - The UC College of Business labs and classrooms have moved to Excel 2007 exclusively so that is what we will be using in class, and that is what will be provided in terms of example and solutions files, though the files will be saved "back" to an Excel 2003 file format whenever possible for maximum compatibility. We cannot support Excel 2003 along with Excel 2007 in the labs or classrooms since the two versions don't play well together on the same machine.
 - You are *strongly* encouraged to use Excel 2007, which really *is* better and has some nice new features. You can get MS Office 2007 cheaply (\$10.11 at the UC Bookstore), which includes Excel 2007. In this case you should get the Revised 3rd edition of the book (copyright 2009); the ten-digit ISBN is 0-324-66244-0, and the thirteen-digit ISBN is 978-0-324-66244-3. This book has been ordered via the University Bookstore and DuBois, but you're free to get it anywhere (see the June 25, 2009 Announcement on the class website on Blackboard for direct links to some online sources).
 - However, if you must stick with Excel 2003 because of company or hardware constraints, you may do so, and submit Excel 2003 files for your class work. In this case you should get the "unrevised" 3rd edition of the book (copyright 2006). It will be up to you, though, to map the Excel 2007 instruction in class back onto Excel 2003, which will not be easy. The "unrevised" 2006 3rd edition is out of print so the only way to get it might be via the used-book market.
 - New copies of the book come with a "Student Resource CD" with data files for the Examples, Problems, and Cases in the book. This CD also contains an excellent interactive tutorial on Excel 2007, as well as instructions to download the Palisade Software "Decision Tools Suite" of Excel add-ins that we'll use and are in the Lindner computer labs (expanded download instructions are being distributed in class as well).
 - We'll use the book heavily, and it has a wealth of information (far more than we can cover, at 1,090 pages) that should make it a valuable reference resource for you far into the future.
- Lecture slides will be handed out in class in hardcopy, and available as .pdf files on the website. You will need the hardcopy for the exams; if you would prefer to print out your own please let me know so we can save paper.
- Additional material will be handed out in class or posted on the website.
- A free online statistics "book," *HyperStat Online* by David Lane if you'd like alternative explanations (<http://davidmlane.com/hyperstat/>). This is in no way a substitute for the course text, and some notation and conventions could be different from what we're using in class. Still, it does have a some great statistics jokes and funny videos (OK, funny to me).
- Optional: *Competing on Analytics: The New Science of Winning*, by Thomas H. Davenport and Jeanne G. Harris, Harvard Business School Press, 2007. This popular-press book narrates examples of how methods in this and the next course (QA 712) have been used to gain a competitive edge in business. It is available from any standard online bookstore, and is inexpensive.

Computing:

- We'll use Microsoft Excel 2007 extensively throughout the course. It is available in the Lindner computer labs, or you may use your own computer. Microsoft Office 2007, which contains Excel 2007, can be purchased by students cheaply (\$10.11 at the UC Bookstore).
- You're expected to know the basics of Excel already (see the footnote on p. 1 of this syllabus for what's meant by "basics"). The Student CD that comes with the book has an excellent and extensive self-guided interactive tutorial on Excel 2007, which is also on the course website under Course Documents (along with the old Excel 2003 version, which is not recommended). Other Excel tutorials are readily available in bookstores and on the web.
- We'll also use the Palisade Software DecisionTools suite of Excel add-ins that comes with the book, from which we'll use StatTools, PrecisionTree, and @RISK. See "Instructions for Downloading and Installing the Palisade DecisionTools Add-Ins" on the course website under Course Documents. This is a two-year license of the educational version of these add-ins, which are widely used in business (<http://www.palisade.com/>). More information about the "book" versions of the software, including its limitations, is on the authors' site <http://www.kelley.iu.edu/albrightbooks/>.
- You may still use Excel 2003 if you wish, but the course will be taught using Excel 2007 (and 2007 is a major upgrade with some nice new features). The downloadable Palisade software may work with Excel 2003 even though it was designed for Excel 2007 (see "Instructions for Downloading ..." handout distributed in class).
- Despite our heavy use of Excel, this is *not* a course *about* Excel ... Excel is our *tool*, but the course is *about* statistics and decision models for managers.

Grading:

- 20%: Two *individual* projects (10% each). The first is due at **Friday Oct. 30 at 5:00pm**, and the second is due at **Friday Dec. 4 at 5:00pm**. Both are to be submitted in electronic form only via upload to Blackboard. These projects will be assigned well in advance, with data sets if applicable. Possible solutions will be posted on Blackboard immediately after the due date/time, so late projects cannot be accepted (the upload site will be closed at the due date/time). To reiterate, these are *individual* projects to be done by yourself, *not* in groups, and you cannot consult with anyone other than the instructor (see "Academic Integrity" below).
- 40%: Mid-term exam (**Monday Nov. 2, 6:00-9:30pm**, 107 Lindner). Open-book, open-notes. Calculators required, but no computers allowed. No sharing books, notes, or calculators.
- 40%: Final exam (**Monday Dec. 7, 6:00-9:30pm**, 107 Lindner). Open-book, open-notes. Calculators required, but no computers allowed. No sharing books, notes, or calculators.

Suggested problems: Problems from the book are assigned on the schedule (next page), but will not be handed in or graded. Solutions will be posted on the website. It is *critical* that you take this seriously and do *all* these suggested problems – you *cannot* learn this material just by watching me or reading the book; you *must* do it yourself.

Academic integrity: I take this very seriously, and you should too as it affects the value of your program and degree, not to mention your fellow students. On each project and exam you will be required to state and sign, in writing, "*On my honor, I have neither given nor received unauthorized aid in completing this academic work.*" Note that *giving* aid to another is academic misconduct, just as is receiving or asking for aid. Knowingly tolerating academic misconduct on the part of another student is itself academic misconduct. Academic misconduct in any form will not be tolerated, and will be dealt with forcefully. If you have any questions about this, please ask *me*, not another student.

Approximate schedule with book sections and handout slides for *advance* reading, and suggested Problems from book. Exam dates and project due dates will not change, though what we cover in each class might be adjusted as we progress.

<i>Mondays</i> 6:00pm-9:30pm, 107 Lindner	<i>Fridays</i> Projects due
9/28 Introduction; Data summary (tables/graphs) Book sections: 1.1-1.5; 2.1-2.7 Slides: 1.1-1.14; 2.1-2.31 Book problems: Chapt. 2: 7, 12, 13, 22, 25, 36, 43, 46, 55	
10/5 Data summary (numerical); Getting/filtering data Book sections: 3.1-3.8; 4.1-4.4 Slides: 3.1-3.15; 4.1-4.12 Book problems: Chapt. 3: 11, 12, 23, 24, 26, 34, 43; Chapt. 4: 3, 4, 6, 8	
10/12 Probability; Bayes' rule Book sections: 5.1-5.4; 7.4 Slides: 5.1-5.26 Book problems: Chapt. 5: 1, 4, 8, 13, 18; Chapt. 7: 19	
10/19 Working with distributions; Sampling and point estimation Book sections: 6.1-6.8; 8.1-8.5 Slides: 6.1-6.15; 8.1-8.8 Book problems: Chapt. 6 ² : 4, 8, 17, 19, 27, 37, 42; Chapt. 8: 5, 36	
10/26 Confidence intervals Book sections: 9.1-9.10 Slides: 9.1-9.22 Book problems: Chapt. 9: 2, 3, 7, 13, 17, 20, 26, 28, 32, 36	10/30, 5:00pm Project 1 due
11/2 Mid-term exam In class, open-book, open-notes, calculator required, no computers No sharing books, notes, or calculators	
11/9 Hypothesis testing Book sections: 10.1-10.8 Slides: 10.1-10.19 Book problems: Chapt. 10: 1, 3, 12, 15, 19, 20, 26, 42, 47, 55	
11/16 Regression modeling and analysis Book sections: 11.1-11.8; 12.1-12.11 Slides: 11.1-11.22; 12.1-12.16 Book problems: Chapt. 11: 1, 7, 12, 22, 24, 27; Chapt. 12: 2, 7, 14, 19, 26, 40	
11/23 Decision analysis Book sections: 7.1-7.7 (re-read 7.4) Slides: 7.1-7.20 Book problems: Chapt. 7: 1, 2, 3, 52, 57, 60	
11/30 Risk analysis and static spreadsheet simulation Book sections: 16.1-16.7 Slides: 16.1-16.14 Book problems: Chapt. 16: 14 ³ , 20, 29	12/4, 5:00pm Project 2 due
12/7 Final exam In class, open-book, open-notes, calculator required, no computers No sharing books, notes, or calculators	

² It's best to use the printed tables, not Excel, to work these Chapter 6 problems, in preparation for the exams.

³ Demand is in thousands, and assume demand is an exact multiple of 1000.

University of Cincinnati College of Business
Department of Quantitative Analysis and Operations Management
QA 711: Statistics and Decision Models for Managers – Fall Quarter 2009

Instructions for Downloading and Installing the Palisade DecisionTools Add-Ins

These instructions assume that you're using the CD supplied with the Revised 3rd Edition of Albright/Winston/Zappe, *Data Analysis & Decision Making with Microsoft Excel*, 2009, though the instructions below should be enough if you don't have the CD. You'll definitely need to be online, hopefully with a pretty fast connection since there's a big file to download. While this software assumes Excel 2007, it should still work with Excel 2003.

Unfortunately, the Palisade add-ins for Excel will not run native on Macs. They want to port to Macs, but it's not there yet. You can run a Windows emulator like BootCamp or Parallels on your Mac (and then you'd have to get Windows XP itself too ... Windows Vista is *not* recommended), and then I'd suggest that you get the \$10.11 Office 2007 (for Windows) from the UC Bookstore. Another option is to use the Lindner labs, which are all set with the software.

1. Insert the CD and a directory window of the CD's contents should appear. If not, use Windows Explorer to open and browse the CD contents.
2. Open the file "readme.txt," which has brief instructions, expanded upon below.
3. (Optional). Copy the entire contents of the CD to a new folder on your hard drive for faster and easier access later to the Example, Problem, and Case files; this is 32MB of material (it is also posted on the class website in case you don't have the CD).
4. To get the DecisionTools suite of Excel 2007 add-ins, open the file "Palisade Add-Ins.html" and go to the website given there (<http://www.palisade.com/bookdownloads/albrightwinstonzappe/>) and click on "» Download software for ..." or on the book-cover graphic.
5. You'll need a copy of the book (the Revised 3rd Edition, 2009) to enter a particular word from the index, as directed on your screen (sort of like a pseudo-password), then click Submit.
6. Fill out the form (* fields are required) with:
 - Professor = David Kelton
 - Course Number and Title = QA 711 Statistics and Decision Models for Managers
 - University = University of Cincinnati
 - Organization = yours, or University of Cincinnati
 - Industry = yours, or Academic
 - Other fields as appropriate to you

Check the "I agree" box at the bottom and click Submit.

7. On the next screen, click "Download DecisionTools ..." and follow the red-text instructions (download the file to your computer). Unzip the entire contents of the downloaded file "DTS_Industrial_Textbook.zip" to its own new folder on your system.
8. In this new folder, double-click "dts50ind.exe" and follow the directions ... this will take a while, depending on your connection speed, as you're downloading a file here of size 111MB.
9. Once the download is complete, be patient for a few minutes until the installation instructions appear. Do the usual Next-Next-Next thing and accept the license terms. Select the button for Complete installation, which takes a while. At the end, downloading SQL Server Express is not needed for the class (if you do download it, your installation box and its Finish button will disappear, which is OK). Installation is now complete; no Restart needed.

There should now be a new item under Start > Programs called Palisade DecisionTools that expands as shown to the right. To run any of these add-ins with Excel 2007, it's generally best *not* to have Excel already running, but instead directly run the add-in you want to use, which itself will in turn start Excel with that add-in loaded as the rightmost tab (in Excel 2007) at the top, and *then* open any existing Excel files. You may want to copy some of these out to your desktop or Quick Launch bar; we'll use StatTools, PrecisionTree, and @RISK in this course.

