

Analytics & Information

Effective: 1/12/2016 (SUBJECT TO CHANGE; visit Blackboard regularly for updates)

01/11/2016-04/22/2016

Section 01, CRN 24887, Tuesday 6:15-8:55pm

Room: BUS 239 (Business School Computer Lab)

Academic Calendar: <http://registrar.richmond.edu/planning/calendar/index.html>

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Office Hours: Tuesday & Thursday from 1:00pm-2:30pm or by appointment

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Overview of the course

The purpose of this course is to provide you with the knowledge, skills, and abilities needed to clean and organize raw data in order to analyze complex business problems and to develop evidence-based recommendations. You will primarily work with relational databases to import, structure, cleanse, transform, filter, and analyze data. After analysis, you will learn how to utilize visualization software to graphically communicate the analytical results. This is a very hands-on course where you will be using a variety of different tools and technologies to analyze business problems and corresponding raw data. Most of the tasks are deliberately designed to be unstructured in order to let you use your creativity, business acumen, and technological skills to “tell a story with data” in order to support your business recommendations.

The goal of this course is not to turn you into computer scientists or techno-MBAs but to provide you with a “working knowledge” of data analysis. As an MBA student, having a working knowledge of data analytics can save you from making decisions based on inaccurate assumptions or faulty intuition. It is ultimately the manager’s job to choose which problems need to be solved and how the company should incorporate analytics into its operations. To do this, you need a working knowledge of data analysis.

The following snippet was taken (and paraphrased) from Florian Zettelmeyer of Northwestern’s Kellogg School of Management (<http://insight.kellogg.northwestern.edu/article/a-leaders-guide-to-data-analytics>), which succinctly explains the core purpose of this course:

Can you imagine an EVP going to the CEO and saying, ‘I don’t really know how to read a balance sheet, but I have someone on my team who is really good at it?’ We would laugh that person out of the room and yet I know a whole bunch of people who, without blinking an eye, would go to the CEO and say, ‘This analytics stuff is complicated. I don’t have a full grasp on it, but I have assembled a crackerjack analytics team that is going to push us to the next level.’ This is an answer that is no longer acceptable given the importance of analytics to everyday decision making.

Learning objectives to be met in this course

- Develop a working knowledge of analytical software tools such as Access, Tableau and JMP.
- Be able to use those tools to discover, analyze, and solve business problems.

- Be able to tell a story with raw data that supports or does not support a particular business recommendation.
- Be able to spot potential business problems and/or trends by analyzing raw data.

Required Books & Readings

1. *Access 2013: The Missing Manual* by Matthew MacDonald (ISBN: 978-1449357412)
2. *Analytics: The New Path to Value* by MIT Sloan Management Review and the IBM Institute for Business Value (<http://c0004013.cdn2.cloudfiles.rackspacecloud.com/MIT-SMR-IBM-Analytics-The-New-Path-to-Value-Fall-2010.pdf>)
3. *Evidenced-Based Management* by Jeffrey Pfeffer and Robert I. Sutton (https://www.homeworkmarket.com/sites/default/files/q/25/04/evidence-based_management_0.pdf)
4. *Before You Make That Big Decision* by Daniel Kahneman, Dan Lovallo, and Olivier Sibony (<http://www.cebma.org/wp-content/uploads/Kahneman-et-al-2001-Before-you-make-that-big-decision-60781382.pdf>)

Software

We will be using Windows based applications in this class. Each student should be able to install all of this software on his/her personal Windows machine for the semester. If you have a MAC and want to use your own machine, you will have to install Windows boot camp (<https://www.apple.com/support/bootcamp/>). The business school computer lab (BUS 239) will be the only computer lab on campus that has all of this software installed.

1. Microsoft Access 2013 and Microsoft Excel 2013.
2. Tableau v9.2 (<http://www.tableau.com/products/desktop>). Tableau will send me the student license key at the start of the spring semester. **NOTE:** Tableau has historically scheduled new releases in March/April so this application may be upgraded in the middle of the semester.
3. JMP Pro 12 (http://chalk.richmond.edu/jmp/windows_install.html).

General Course Policies & Guidelines

Class preparation & debriefing: To be successful in this course you should expect to devote 10-14 hours each week in class, reading and studying the material, and preparing assignments. Most of the tools and techniques require repetition to learn. How much repetition is required will vary from individual to individual. As such, preparation will require some combination of repeating the in-class exercises, completing the homework problems, and reading the appropriate references. The in-class mini-cases will require you to have the homework completed before the start of the class period in order to successfully follow along.

The instructor as resource: “To teach” means to “pass on knowledge,” while “to learn” means “to acquire knowledge and skills.” As course instructor, my job is to teach you what I know and understand about data analysis by organizing the course around important topics, key instructional materials and assignments while acting as a facilitator, resource, and guide. You can ask me questions and ask me for extra help (in-person or via email), and I will do my best to assist you, but it is your job to learn ... even when learning is hard work!

I took this position because I enjoy teaching. I genuinely care about you and your progress in the class. If you have a problem, complaint, comment, concern, etc., **please** schedule an appointment or drop in during open office hours. If something is not working for you, don't wait until the very end of the

semester to speak up. Come in and speak with me so we can work together to maximize your experience in this course.

Expectations for student behavior: I expect each student to demonstrate **respect** for his or her fellow students individually and as a class, to me as your instructor, to the Robins School of Business as a place of learning – and to himself or herself. In addition to the typical ways we should be respectful (e.g., language use, politeness, cooperation, openness to new ideas, etc.), being respectful means **no cheating and no plagiarism**. To be clear, **cheating** includes, but is not limited to, copying someone else's work, with or without their knowledge, and turning it in as your own work. **Plagiarism** includes, but is not limited to, copying intellectual property from others (on the web, in books, etc.) and presenting it as your own work, without proper citation. If I identify instances of cheating or plagiarism, ***the students involved will receive a failing grade (F) for the class and instances of cheating or plagiarism will be reported to the Honor Council for possible further sanctions.*** Make sure you familiarize yourself with Richmond's honor code (<http://studentdevelopment.richmond.edu/student-handbook/honor/the-honor-code.html>). Not knowing the policies and procedures related to my course AND the University of Richmond is not an excuse to violate those policies and procedures. ***When in doubt, don't do it and ask me for clarification.***

Other Resources Available to Students: If you experience difficulties in this course, do not hesitate to consult with me either in-person or via email. I am on-campus all week, so don't be limited by my office hours should you need to consult with me. There are also other resources that can support you in your efforts to meet course requirements and learn the material.

Academic Skills Center (<http://asc.richmond.edu>, 289-8626 or 289-8956): Helps students assess their academic strengths and weaknesses and hone their academic skills.

Counseling, Psychological & Disability Services (<http://caps.richmond.edu> or 289-8119): Assists students in meeting academic, personal, or emotional challenges. If you are disabled and require special assistance to complete this course, please contact disability services to process your request at the very beginning of the course. You must complete a "Disability Accommodation Notice" within the first two weeks of the semester (see <http://studentdevelopment.richmond.edu/disability-services/index.html>).

Writing Center (<http://writing.richmond.edu> or 289-8263): Assists writers at all levels of experience, across all majors.

Class Participation & Attendance: **Robins School of Business policy dictates that I cannot assign a passing grade to any student who does not attend at least 75% of the class sessions.** Having said this, my assumption is that all students who are taking my class are adults. If you, as an adult, choose to miss class on a given day, I assume that 1) you understand that you are missing a component of the class, 2) you have decided that whatever you have chosen to attend in lieu of class is more important than what is happening in class that day, and 3) you are willing to accept any consequences of missing what happens in class that day (lecture material, interaction with your classmates, classroom presentations, exams, and so on).

Religious Observance Policy: Students needing to miss class because of religious observance should contact me within the first two weeks of the semester to discuss the absence. The University's full religious observance policy may be found here (<http://registrar.richmond.edu/services/policies/religiousobsv.html>).

Assignments & Deliverables

NOTE: *Asking for an extension on an exam or an assignment because you have a lot of work to do in other classes is not a valid reason for an extension.* Make-up exams will only be administered for very special circumstances and serious illnesses. Should one of these special circumstances arise, you must contact me **BEFORE** the exam in order to make arrangements for a make-up exam.

Midterm: This test will be done ***individually***. The test will cover evidenced-based management (concepts), constructing a data model in MS Access, cleaning/loading data into the MS Access database, querying data, and visualizing data in Tableau. The exam will probably have a take-home component and an in-class component with the majority of the tasks/questions being hands-on in nature.

Final Exam: This will be a ***cumulative*** exam that will be done ***individually***. This exam will also be hands-on in nature and may involve performing several data analysis tasks related to any concept covered in the class. This test will have you build a data model in MS Access 2013, load data into the MS Access database, perform a series of Monte-Carlo simulations based off of the raw data, perform other predictive analytics using multiple regression using JMP Pro 12, and visualize the results in Tableau. This exam will also probably have a take-home component and an in-class component.

One Case Study: This case study will involve making a data-driven recommendation regarding a business problem. I will permit you to work in groups of no more than three (preferably two). The case study will require building a data model in Access, analyzing the data, and creating a single dashboard in Tableau to present your findings and recommendations. I will then ask an in-class extension problem to the case (e.g., add more data, change part of the case, write an additional set of queries, and so on). You will then present the case in-class. The goal of the case study is for you to apply and extend the concepts learned in class by applying the concepts to a simulated (or real) problem that requires some data analysis to solve. *I will accept this assignment late at a penalty of one point deduction per day late*, but turning in a late case means that you will probably not receive any points for the in-class extension exercise or the in-class presentation.

Book Summary: *You have to read one of the following books (your choice):*

1. *Competing on Analytics: The New Science of Winning* by Thomas H. Davenport and Jeanne G. Harris (ISBN: 978-1422103326)
2. *Analytics at Work: Smarter Decisions, Better Results* by Thomas H. Davenport, Jeanne G. Harris, and Robert Morison (ISBN: 978-1422177693)
3. *Big Data @Work: Dispelling the Myths, Uncovering the Opportunities* by Thomas H. Davenport (ISBN: 978-142216816)
4. *Keeping Up with the Quants: Your Guide to Understanding and Using Analytics* by Thomas H. Davenport and Jinho Kim (ISBN: 978-142218725)

You will then ***individually*** write a brief summary (in your own words) of each chapter AND explain how the concepts are relevant to your current job, an aspirational job, your chosen career, or something else relevant to you. If you found something in the chapter that you did not agree with, then you can also explain why you did not agree with the author. **NOTE:** You cannot choose a book that you have read in another class!

Capstone Data Analysis: This course is supposed to help you with your capstone project. As such, you will have to analyze your capstone data using the process outlined in this class. If you do not have your capstone data, we can simulate the type of file that you will need to answer your question. The purpose of this deliverable is to apply the skills learned in this class and to utilize me as a resource to help you complete your capstone project. The final deliverable will depend on what stage you are at with your project, because each student may be at a different stage in their project. If you are already finished with

your capstone, I will supply you with a data file to satisfy this deliverable or you can analyze some data from your job to satisfy this deliverable.

Homework Assignments: After most class meetings you will be given an assignment to complete. You may work individually or in groups to complete these assignments. That being said, I expect you will get the most value from each assignment if you perform the work independently (and then confer with classmates). ***I will not collect or grade any of these assignments, but these are required.*** If I feel that the class as a whole is not completing the homework assignments, I will randomly ask a student to present his/her homework solution in front of the class. It will be very difficult to succeed in this class if you are not doing the homework assignments. I will provide answer keys and/or reference files ***AFTER*** the assignments are due. If at any point you are unable to derive how I obtained any given result, please feel free to meet with me and I am happy to discuss.

Adding up the points

	Points	%
Midterm Exam (<i>Individual</i>)	30	30%
Final Exam (<i>Individual</i>)	30	30%
Case Study (<i>Teams or Individual</i>)	25	25%
Capstone data analysis (<i>Individual</i>)	10	10%
Book Summary (<i>Individual</i>)	5	5%
Total	100	

A ≥93%	A- ≥90% & <93%	B+ ≥87% & <90%
B ≥83% & <87%	B- ≥80% & <83%	C+ ≥77% & <80%
C ≥73% & <77%	C- ≥70% & <73%	D+ ≥67% & <70%
D ≥63% & <67%	D- ≥60% & <63%	F < 60%

TENTATIVE Course Schedule
SUBJECT TO CHANGE; Visit Blackboard regularly for updates

Date	Topic	Homework/Readings Due on Date of Class	Learning Objectives
1/14/2016	Evidenced-Based Management <i>Software:</i> Excel (time permitting)	<ol style="list-style-type: none"> 1. Review the syllabus. 2. Purchase Access book. 3. Purchase the book summary book that you want to read. 	<ol style="list-style-type: none"> 1. Understand the structure of the course, policies, and procedures. 2. Understand evidenced-based management and data driven decision making and to be able to contrast axiom (theory) based management versus evidenced based management. 3. Understand the analysis framework that will be used in this class.
1/21/2016	Relational Database Design <i>Software:</i> Access	<ol style="list-style-type: none"> 1. <i>Analytics: The New Path to Value</i> 2. <i>Evidenced-Based Management</i> 3. <i>Before You Make That Big Decision</i> 	<ol style="list-style-type: none"> 1. Understand why we use a relational database to store, organize, and structure data. 2. Conceptually understand one-to-one, one-to-many, and many-to-many relationships. 3. Build the tables and associated relationships in Access.
1/28/2016	Building the Relational Model in Access <i>Software:</i> Access	<ol style="list-style-type: none"> 1. Homework #1 (build the tables and relationships in Access). 2. Read <i>Access Missing Manual</i> pages 1-89 & 161-190. 	Homework #1 covers building the tables and relationships in Access. In-class, you will learn the following: <ol style="list-style-type: none"> 1. The process to load data. 2. Load data from text files, Excel files, XML files, and other databases. 3. Be able to resolve common data loading issues. 4. Action queries (UPDATE, INSERT, DELETE)
2/4/2016	Analysis Queries <i>Software:</i> Access	<ol style="list-style-type: none"> 1. Homework #2 (data loading) 2. Read <i>Access Missing Manual</i> pages 201-301. 	<ol style="list-style-type: none"> 1. Querying data to descriptively analyze data. 2. We will cover basic SELECT queries, summary queries (aggregate function queries), and calculated fields.
2/11/2016	Application of Concepts <i>Software:</i> Access	<ol style="list-style-type: none"> 1. Homework #3 (queries) 	<ol style="list-style-type: none"> 1. Apply the skills learned in the first four class sessions to a practical example/mini-case.
2/18/2016	Analysis Queries & Data Visualization <i>Software:</i> Access & Tableau	<ol style="list-style-type: none"> 1. Homework #4 (extension to the practical example) 	<ol style="list-style-type: none"> 1. Introduction to Tableau 2. Tableau dashboards
2/25/2016	Exam Review	<ol style="list-style-type: none"> 1. Homework #5 (Tableau exercises) 2. Status check on capstone and Book summary deliverables. 	Exam Review
3/3/2016	<u>Midterm Exam</u>		
3/17/2016	Predictive Analytics <i>Software:</i> Tableau & Access	<ol style="list-style-type: none"> 1. Homework #6 (more Tableau exercises) 	<ol style="list-style-type: none"> 1. Data blending and forecasting in Tableau

3/24/2016	Predictive Analytics <i>Software:</i> Access, Excel, and Tableau	1. Homework #7 (data tables)	1. Understand when and why we use Monte-Carlo simulations. 2. Run Monte-Carlo simulations for uniform, exponential and normal distributions.
3/31/2016	Case Day		
4/7/2016	Predictive Analytics <i>Software:</i> Access, Excel and JMP	1. Homework #8 (Monte-Carlo Simulation)	1. Introduction to multiple regression
4/14/2016	Capstone Project Working Day	1. Homework #9 (Multiple regression)	1. Capstone project working day
4/21/2016	Class Wrap-up	1. Last day to turn in your book summaries. 2. Last day to turn in your custom data analysis projects	Class wrap-up and exam review
4/28/2016	Final Exam		