RUTGERS UNIVERSITY
SCHOOL OF BUSINESS
CAMDEN NJ 08102

Course: 53:716:502:01:04871
BUSINESS ANALYTICS

September 7 to December 21, 2022
Wednesdays, 6:00 – 8:50 PM
BSB 335

Instructor: Dr. Mamnoon Jamil
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Office Hours: Before or after class or by appointment
E-mail: mamnoon@camden.rutgers.edu
Canvas: https://rutgers.instructure.com/courses/202763
HBSP Cases: https://hbsp.harvard.edu/import/962975

COURSE DESCRIPTION AND OBJECTIVES

Analytic competency is becoming tremendously important in the business world and is often the factor that distinguishes leading firms in any industry. Companies like Netflix, Marriot International, Capital One and Progressive Insurance have succeeded in their industries mainly due to their distinctive analytic competencies. This course is intended to provide an introductory overview of how firms implement data-driven decision making. Students will learn statistical concepts, use spreadsheet modeling and learn through a mix of lectures, cases and class discussion. Students are required to bring the textbook to class in the event we cover problems from the book chapters. It's also helpful for every student to bring a laptop loaded with some variant of spreadsheet software (e.g., Microsoft Excel). The primary goal of the course is to coach students on "**fact-based decision making**" and to enable them to carefully plan and run "**business experiments**" in order to make managerial decisions (i.e., implement a "test and learn" philosophy).

Learning Objectives:
After completing this course, a student must be able to:

- Understand how companies use analytics
- Make fact-based decisions, grounded in statistical data analysis
- Perform data analysis and statistical tests in Excel
- Design and implement small-scale business experiments

PREREQUISITES

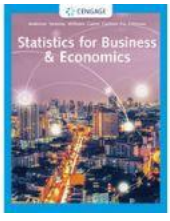
Basic knowledge of probability and statistics, e.g., the concepts of mean, standard deviation and a probability distribution. If you want to get a head start, please review pages 287 – 299 in the book, particularly the Normal probability density function. Appendix 6.2 on page 317 is also useful.

INSTRUCTOR AVAILABILITY

You may request for an appointment before or after the class by sending an email. I encourage e-mail communication and normally make every effort to answer your question(s) within a few hours.

TEXTBOOK AND READINGS

The course will use the following textbook:
Statistics for Business and Economics, Andersen, Sweeney, Williams, Camm, Cochran, Fry, Ohlmann, 14th edition, ISBN: 978-1-337-90106-2, published by Cengage Learning.



Statistics for Business & Economics , 14th Edition

David R. Anderson; Dennis J. Sweeney; Thomas A. Williams; Jeffrey D. Camm; James J. Cochran; Michael J. Fry; Jeffrey W. Ohlmann
ISBN-10: 1-337-90106-7
ISBN-13: 978-1-337-90106-2

In addition to the textbook, you are required to purchase *HBSP cases*, available at the following hyperlink: https://hbsp.harvard.edu/import/962975

Chapters from this book have been assigned as background reading with the material being covered. Lectures will follow the book. The book also provides technical details that may not be discussed in class. You are especially encouraged to read materials outside of the classroom.

Please feel free to share with everybody web-links/photocopies of newspaper/magazine articles informing us of topical issues and events in the world of Big Data and Analytics. It will also be useful for you to keep abreast of important issues and events by reading popular business periodicals.

The outside readings are very useful for your presentations and highly recommended. If you have access to the cases / articles from other sources (such as cases from your previous courses or articles from the Library System) please feel free to use them.

How to succeed in this course

The material presented in class provides the essential backbone of the course. You are expected to:

- Read all text material assigned for each class
- Follow instructions in all assignments
- Start assignments early and get feedback from the instructor (if needed)
- Consult/meet with the professor immediately when you need help
- If an online tool is used (Canvas) ensure that you can access and use it appropriately.

COMMUNICATION

Canvas

All class materials can be obtained via Canvas. You are strongly encouraged to access this course via Canvas several times a week. To access this system, go to http://canvas.rutgers.edu log in, and click on the course on the dashboard.

Rutgers Email - Use Your Rutgers email Address

All communications to students will be done using the Rutgers email address provided to you. Please forward your Rutgers email to your personal email if necessary. Not checking your Rutgers email is not an excuse for missing any communications.

GENERAL /ADMINISTRATIVE

Pronouns

This course affirms people of all gender expressions and gender identities. Feel free to correct me on your preferred gender pronoun. If you have any questions or concerns, please do not hesitate to contact me.

Chosen Name (Preferred Name)

If you have a chosen name or preferred name other than what is listed on the roster, kindly let me know. If you would like to have your name changed within the rosters officially, go to: https://deanofstudents.camden.rutgers.edu/chosen-name-application

COURSE REQUIREMENTS AND GRADES

Grading Scheme

To determine the final course grade, the course requirements will be weighted as follows:

Class Participation:	5%
Homework:	10%
Data Analysis Exercise:	10%
Case Presentation	15%
Exam I:	30%
Exam II:	30%

Grade Ranges

Tentative Letter Grade Description:

A: 90% and above
B+: 85% to 89.9%
B: 80% to 84.9%
C+: 75% to 79.9%
C: 70% to 74.9%
D: 60% to 69.9%
F: Below 60%

CLASSROOM POLICIES

Class participation

It is expected that you will (1) attend class regularly and arrive on time, (2) listen attentively in class, and (3) contribute often to class discussions.

This being a course requiring careful thinking, the entire class's learning experience will be enhanced by class participation. Your in-class comments should be thoughtful and should reflect your careful reading of the assigned course material. Through class participation, you will get an opportunity to listen to the perspectives of peers from other functional area majors, and to inform them of your own views / opinions. Participating in the class will stimulate independence in thought and action. True learning starts unfolding as the "right" questions start coming from the class, which steers the analysis forward by finding answers to those questions.

A significant portion of your class participation will also depend on your preparedness and participation during the case / presentations.

Participation and Late Work:

Lack of participation will be reflected in the final grade. All assignments must be handed in on time; late work will receive reduced or no credit. No makeup exams will be scheduled without prior notification and a physician's excuse.

Incompletes and Problems:

If you find that you are having trouble completing course work or need further explanation of class topics, please schedule an appointment with me immediately. If you need this class for graduation, you should be sure that your performance is up to standard throughout the course. It is too late to wait until

the last week of classes to ask for help. I'm available to meet throughout the entire semester if you need help. "Incompletes" will only be given through prior consultation, under extreme circumstances.

Exams
There will be two exams held during the semester. Exams may be a combination of multiple choice, fill in the blanks, and computation problems. While the exams will be closed book, you are allowed to bring an 8.5" X 11" both-sided "cheat sheet", on which you may write anything you wish. The idea is that in making the sheet you develop the skills to summarize important points that you can refer to. After going through this exercise, it is not unusual for students to say that they never used the sheet on the exam, since they already knew what they wrote very well.

Exam Make-up Policy/Late Policy
If, for a university approved reason, you cannot take an exam at the scheduled time you must give the professor written notice at least one week in advance so that other arrangements can be made. If the situation does not allow for advance notification (for example, emergency hospitalization), contact the professor as soon as possible after a missed exam. Make-up exams for non-university approved reasons are not guaranteed. The professor reserves the right to request written documentation to support your absence (such as a doctor's note, an obituary, or military orders).

Case Presentations
The class will be divided into groups of 2 students. Each of these groups will present a case from the list of the Harvard Business School cases (enclosed at the end) and will be responsible for working on analyzing the case. Each student may need to buy & download the case from the Harvard Business School Publishing (HBSP). If you don't have an account with HBSP, you must create a free account first with HBSP before downloading the case from the HBSP site. Each group will submit both soft & hard copies of the case presentation. The case presentation is due at the beginning of the class. The group should present (or summarize) the case in 20 minutes.

- The presentation will require the group to present a detailed up-to-date overview of a particular company and discuss how Business Analytics and its' applications are essential for a particular company's competitive advantage. In the presentations, please make sure that the company's historical and current challenges / strategies are well articulated.
- The group may deal with a detailed Harvard Business School case. The group will have to present the case/article overview, the issues, analyses, and recommendations.

Every group is required to **submit** a professional quality PowerPoint presentation (both softcopy and hardcopy). Please refer to the detailed course outline for the submission dates.

Note that there will be ***peer evaluations*** *of every member* in each group to enable the professor to properly assess every student's participation and contribution in the case presentation.

Student Information Forms
Turn in an accurate student information form by class 2.

Disability Services/Accommodations

The University is committed to supporting the learning of all students and faculty will provide accommodations as indicated in a Letter of Accommodation issued by the Office of Disability Services

(ODS). If you have already registered with ODS and have your letter of accommodations, please share this with me early in the course. If you have or think you have a disability (learning, sensory, physical, chronic health, mental health or attentional), please contact https://success.camden.rutgers.edu/disability-services.

Accommodations will be provided only for students with a letter of accommodation from ODS. Their services are free and confidential. Letters only provide information about the accommodation, not about the disability or diagnosis.

Academic Integrity

The Academic Integrity policy can be found at http://studentconduct.rutgers.edu/student-conduct-processes/academic-integrity/

Students are responsible for understanding the principles of academic integrity and abiding by them in all aspects of their work at the University. Students are also encouraged to help educate fellow students about academic integrity and to bring all alleged violations of academic integrity they encounter to the attention of the appropriate authorities.

Academic Integrity means that you (the student) must:

- properly acknowledge and cite all use of the ideas, results, or words of others,
- properly acknowledge all contributors to a given piece of work,
- make sure that all work submitted as your own in a course activity is your own and not from someone else
- obtain all data or results by ethical means and report them accurately
- treat all other students fairly with no encouragement of academic dishonesty

Adherence to these principles is necessary in order to ensure that:

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments
- all student work is fairly evaluated and no student has an inappropriate advantage over others
- the academic and ethical development of all students is fostered
- the reputation of the University for integrity is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld. Violations are taken seriously and will be handled according to University policy.

Student Code of Conduct

Rutgers University-Camden seeks a community that is free from violence, threats, and intimidation; is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and does not threaten the physical or mental health or safety of members of the University community, including in classroom space.

As a student at the University, you are expected adhere to the Code of Student Conduct.
To review the code, go to the Office of Community Standards:
https://deanofstudents.camden.rutgers.edu/student-conduct

Note that the conduct code specifically addresses disruptive classroom conduct, which means *"engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."*

Etiquette Expectations from Students

The following protocols on the codes of behavior reflect professional business norms on manners, courtesy, and respect. (***In general, you should treat others as you would like others to treat yourself. Be mindful that what is acceptable in a text or chatroom with friends may not be appropriate in a classroom or in an online conversation with an instructor***.)

Even though many of you are already aware of these protocols, they are explicitly stated here so that everyone is cognizant of the same protocols. These protocols should be followed by all students taking this course to help ensure the experiences for everyone involved are pleasant. They are as follows:

- If you were to send an e-mail to the professor / tutor, please address the person appropriately such as "Dr. …." or "Mr./Ms. …." ,not 'Hey'. Note that I will address you with your first name, unless you prefer that I address you differently.
- When sending an e-mail, you can get better attention by using the following guidelines:
    - use descriptive subject lines, (I am sure you have received a lot of Spam e-mails and I have occasionally and accidentally deleted student e-mails that I thought was Spam.)
    - please be as brief as possible by going straight to the point, and if possible, limit the use of attachments

Never send offensive and insulting messages (this is a violation of the Student Code of Conduct)
If you disagree, say so and state your reasons. Social media is a very powerful tool for communication. However, it can be badly misused if it is not used correctly or professionally. For example, you may have personal and legitimate concerns with this course. However, other students, who do not have similar feelings, can be negatively influenced by your concerns. This will unnecessarily and negatively affect their overall experience of the course. Therefore, to minimize such an occurrence, please feel free to directly contact the instructor/tutor first to resolve any concerns that you may have to help ensure that everyone's experience of this course is beneficial.

- Always guard against inciting others when it comes to content, opinions, etc. That is, avoid blaming or accusing others of wrong doing.
- Do not start a volley of back-and-forth e-mails, with copies distributed to every student in the class.
- Copy the minimum number of people. That is, send e-mails to only the people you think should receive and will benefit from it.
- Treat all e-mails and postings as permanent forms of written record and do not expect that any your e-mail communications to be private, unless stated otherwise. Instead, assume that all e-mail communications are public.
- Do not publicize your own or others' personal information (such as email, phone numbers, last names, etc.)

TENTATIVE COURSE OUTLINE

Class	Date	Material	Chapters
1	September 7	Data and Statistics, Descriptive Statistics, and Introduction to Probability Review	This lecture will also *briefly* review and summarize Chapters 1 to 4 (pre-requisites).
2	September 14	Discrete & Continuous Probability Distributions Review	Chapters 5 and 6 (pre-requisites); *Student Information form due.*
3	September 21	Sampling & Sampling Distributions	Chapter 7
4	September 28	Interval Estimation	Chapter 8
5	October 5	Hypothesis Tests	Chapter 9
6	October 12	Simple Linear Regression	Chapters 14
7	**October 19**	**Exam 1**	**Chapters 1-9**
8	October 26	Inferences about Means and Proportions	Chapters 10
9	November 2	Inferences about Population Variances	Chapters 11
10	November 9	Experimental Design and Analysis of Variance	Chapter 13
11	November 16	Experimental Design and Analysis of Variance (cont …)	Chapter 13 (cont…)
12	November 30	Multiple Regression	Chapter 15
13	December 7	Data Analysis Exercise by each student. Case Report by All Groups. Case Presentation (Groups 1 to 7)	Data Analysis Exercise & Case Report Due, Group Presentation.
14	December 14	Case Presentation (Groups 8 to 15)	Group Presentation
15	**December 21**	**Exam 2**	**Chapters 10, 11, and 13 to 15**

Note: Changes may be made to this tentative course outline if needed.

Individual Book Chapter Readings/HW Problems/Video Resources

Class 1: Review of pre-requisites - Chapters 1 - 4
Chapter 1: 5, 7-10, 15-17
Chapter 2: 35-38, 42-47, 57-59, 65-68, 71-77
Chapter 3: 109–117, 122– 126, 129-135, 142-148, 150-153
Chapter 4: 178-185, 189-190, 193-197, 199-203

Video Resource: http://www.khanacademy.org/#browse under **Probability**.

HW Problems: Page 187: #4, #7, Page 192: #19, Page 197: #23, Page 204: #30

Useful Excel Functions: MAX(), MIN(), AVERAGE(), STDEV(), MEDIAN()

Class 2: Review of pre-requisites - Chapters 5 and 6
Chapter 5: 224-226, 228-230, 233-234, 242-243, 248-255, 258-260
Chapter 6: 282-285, 287-296, 299-300, 302-304

HW Problems: Page 235:#15, Page 256:#32, Page 260:#44, Page 286:#2, Page 297:#17, Page 304:#32

Class 3: Chapters 7 ---- Read entire chapter

HW Problems: Page 342: #25, Page 347: #32, Page 360: #47

Useful Excel Functions: NORM.DIST(), NORM.INV(), NORM.S.DIST(), NORM.S.INV()

Class 4: Chapter 8
Chapter 8: Read entire chapter

HW Problems: Page 379: #3, Page388: #14, Page 392: #27, Page 396: # 35

Useful Excel Functions: T.DIST, T.DIST.2T(), T.DIST.RT(), T.INV(), T.INV.2T()

Class 5: Chapter 9
Chapter 9: Pages 418-447

HW Problems: Page 437: #16, Page 444: #31, Page 449: #42

Class 6: Chapter 14
Pages 654-662, 668-672; 675-682, Appendix 14.1 on Page 726

HW Problems: Page 672: #15 and #16, Page 683: #25
Useful Excel Functions: SLOPE(), INTERCEPT(), CORREL(), RSQ()

Class 7: Exam 1 (Chapters 1 to 9)

Class 8: Chapter 10 ---- Read entire chapters
HW Problems: Page 488:#5, Page 495:#14, Page 502:#27, Page 507:#33

Class 9: Chapter 11 ---- Read entire chapters
HW Problems: Page 534:#1, Page 542:#14

Class 10 & 11: Chapter 13
Pages 598-612, 621-625
HW Problems: Page 613: #7, Page 626: #22

Class 12: Chapter 15
Chapter 15: Pages 732-738, 743-744, 747-751
HW Problems: Page 739: #4, Page 745: #13, Page 752: #19

Class 13 & 14: Data Analysis Exercise, Case Report, and Case Presentation

Class 15: Exam 2 (Chapters 11, 13, 14 & 15)

Other Resources:

- Video Resource: See http://www.khanacademy.org/#browse under **Statistics**

HBS COURSE MATERIAL (purchase online at: **https://hbsp.harvard.edu/import/962975**)

1. A Game of Two Halves: In-play Betting in Football, Product #: IMB401-PDF-ENG
2. Analytics Empowering Agriculture: Jayalaxmi Agro Tech, Product #: IMB731-PDF-ENG
3. Applications of Business Analytics in Healthcare, Product #: BH625-PDF-ENG
4. Big Data, Analytics and the Path From Insights to Value, Product #: SMR372-PDF-ENG
5. Boost Your Marketing ROI with Experimental Design, Product #: R0109K-PDF-ENG
6. Giving Data A Voice: The Rise of TalkingData, Product #: NTU245-PDF-ENG
7. Social Media Analytics for Enterprises: Typology, Methods, and Processes, Product #: BH880-PDF-ENG
8. Tamarin App: Natural Language Processing, Product #: 118015-PDF-ENG
9. TD Canada Trust, Product #: 110049-PDF-ENG
10. TSG Hoffenheim: Football in the Age of Analytics, Product #: 616010-PDF-ENG
11. Tech Talk: Creating a Social Media Strategy, Product #: W17432-PDF-ENG
12. Virgin Mobile USA: Pricing for the Very First Time, Product #: 504028-PDF-ENG
13. Web Analytics at Quality Alloys, Inc., Product #: CU44-PDF-ENG
14. Pilgrim Bank (A): Customer Profitability, Product #: 602104-PDF-ENG
15. Apollo Hospitals: Differentiation through Hospitality, Product #: IMB425-PDF-ENG