

**Operations Research**  
**Course Number: 22:711:573**  
**Course Title: Data Driven Analysis for Decision-Making**

## COURSE DESCRIPTION

This course introduces data-driven model-building and analytic techniques used in the decision-making processes of an organization. It introduces key concepts of both deterministic and probabilistic models, including forecasting using linear regression; inventory management; linear programming algorithms; and queuing (waiting line) analytics.

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## COURSE MATERIALS

**TEXT:** Levine, Stephan, Krehbiel & Berenson, *Statistics for Managers Using Microsoft Excel*, 8th Edition, Prentice Hall, 2017 (for linear regression and correlation)

Anderson, Sweeney & Williams, *An Introduction to Management Science: Quantitative Approaches to Decision Making*, 15th Ed., Cengage Publishing, 2019.

**SOFTWARE:** *Microsoft Excel with Solver Add-In loaded*

All course materials are on <http://canvas.rutgers.edu> and all readings are mandatory. Your username is your Rutgers NetID (<http://netid.rutgers.edu/>).

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## LEARNING GOALS AND OBJECTIVES

This course is designed to help students develop skills and knowledge in the following area(s):

- **Business knowledge.** Students will have a command of analytical techniques and their application.  
Students who complete this course will demonstrate:
  - a) Mastery of fundamental analytical concepts and an ability to integrate and apply these concepts to solve practical business problems.
  - b) Proficiency at analyzing and interpreting numerical data to solve practical business problems.
- **Ethical judgement.**  
Students who complete this course will demonstrate:
  - a) Recognition of ethical dilemmas in decision-making scenarios.
  - b) Ability to critically evaluation business decision-making scenarios and develop innovative and ethical solutions.
- **Global perspective.** Students will have the breadth of perspective necessary to effectively function in a global and diverse business environment.  
Students who complete this course will demonstrate:

- a) Ability to lead and/or participate in culturally and demographically diverse teams and classroom environment.
- **Persuasive communication.** Students will be effective communicators.  
Students who complete this course will demonstrate:
  - a) Ability to construct clear, concise, and convincing written descriptions of how analytical techniques are used in their businesses.
  - b) Ability to construct and deliver clear, concise, and convincing oral presentations.

Students develop these skills and knowledge through the following course activities and assignments:

- **Lectures.** Class lectures focus on the underlying theory and application of analytical techniques and models to business situations. A significant amount of time is allocated to examples and homework solutions to illustrate the concepts covered in the lectures, and to a discussion of reading assignments.
- **Readings.** Readings from newspapers and magazines relevant to each topic are posted on canvas.com. In addition to required reading from the textbook, these readings are mandatory and will be discussed in class.
- **Homework.** Homework problems on the topics covered will be assigned at the end of every lecture and reviewed at the beginning of the next class. Assignments by topic are shown in the table at the end of this syllabus.
- **Written assignments.** Each student is required to individually submit a written description (maximum of one **typed and proofread** page) on how the concepts covered in each class could be used in his/her work. These assignments will be due at the beginning of the next class and must include a brief description of the organization and the specific problem being addressed, the data to be used, how the specific statistical technique will be applied, and how the results will be used. All assignments must be submitted to Grammarly (software available to RBS students), errors corrected, and the Grammarly report submitted with the assignment through Canvas **prior to** the beginning of the class in which it is due in order to receive credit. Selected submissions will be read to the class each week and posted on canvas. **Late assignments are not accepted.**
- **Examinations.** There will be an online midterm examination, during class 5, which will include material covered through the previous four classes, and an online non-cumulative final examination, during class 10, which will cover all remaining classes of the semester. **You are expected to take these examinations when scheduled.** If you take either exam on the scheduled date, you must let me know beforehand, provide full documentation of the reason, and make arrangements before the date of the examination.
- **Team Presentation.** Each study group which did not present during the Fall semester will be expected to make a 10-minute presentation on an application of one of the topics in this course. The application must pertain to a specific problem in one of the group members' organizations, using real data from that organization. A proposal for the presentation is due from each group at the beginning of class 4.

## ACADEMIC INTEGRITY

*I do NOT tolerate cheating.* Students are responsible for understanding the RU Academic Integrity Policy <http://academicintegrity.rutgers.edu/>

I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work. Don’t let cheating destroy your hard-earned opportunity to learn. See [business.rutgers.edu/ai](http://business.rutgers.edu/ai) for more details.

## GRADING POLICY

Midterm (if presentation during spring semester)	42.5%
Midterm (if presentation during last semester)	47.5%
Final (if presentation during spring semester)	42.5%
Final (if presentation during last semester)	47.5%
Team Presentation (if during spring semester)	10%
Written assignments	5%

## COURSE TOPICS, READINGS, AND ASSIGNMENTS

Topic	Reading	Assignment
Linear Regression and Correlation (Stat text)	Ch13/13.1-.5,13.7-.9, Excel, + canvas.com readings	13.7a-d-excel,13.27-excel, 13.32a, Excel:13.19ac,13.45a
Introduction to Operations Research (Mgt Sci text)	Ch 1	
Inventory Models EOQ Model	Ch. 10/10.1,.3 + canvas.com readings	Ch10/excel + manual:4,17, 18
Linear Programming Formulations Computer solutions	Ch. 2,3,4 + canvas.com readings Note: error on page 55 - third constraint should be $\leq$	Ch2/24a,41a-formulate Ch3/use Excel – NOT graph: Ch3/1abc,2ab,5,14,15bc Ch4/Excel:3 Note error in back of book: Ch3/14c incorrect (signs reversed)
Queuing Models M/M/1,M/M/s and M/D/1 models Economic analysis and optimization	Ch11/11.1-.7 + canvas.com readings	Ch11/manual - 1,2 manual+excel: 3,4,14,15 manual - 27

## SUPPORT SERVICES

If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. More information can be found at [ods.rutgers.edu](http://ods.rutgers.edu).

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email [dsoffice@echo.rutgers.edu](mailto:dsoffice@echo.rutgers.edu)]

[Rutgers University-Newark ODS phone (973)353-5375 or email [ods@newark.rutgers.edu](mailto:ods@newark.rutgers.edu)]

If you are *pregnant*, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email [jackie.moran@rutgers.edu](mailto:jackie.moran@rutgers.edu)]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email [TitleIX@newark.rutgers.edu](mailto:TitleIX@newark.rutgers.edu)]

If you seek *religious accommodations*, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email [deanofstudents@echo.rutgers.edu](mailto:deanofstudents@echo.rutgers.edu)]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email [DeanofStudents@newark.rutgers.edu](mailto:DeanofStudents@newark.rutgers.edu)]

If you have experienced any form of *gender or sex-based discrimination or harassment*, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention and Victim Assistance provides help and support. More information can be found at <http://vpva.rutgers.edu/>.

[Rutgers University-New Brunswick incident report link: <http://studentconduct.rutgers.edu/concern/>. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link: [https://cm.maxient.com/reportingform.php?RutgersUniv&layout\\_id=7](https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7) . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at [TitleIX@newark.rutgers.edu](mailto:TitleIX@newark.rutgers.edu). If you wish to speak with a staff member who is confidential and does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email [run.vpva@rutgers.edu](mailto:run.vpva@rutgers.edu)]

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via <https://temporaryconditions.rutgers.edu>.

If you are a military **veteran** or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of **mental health** services, please use our readily available services.

[Rutgers University-Newark Counseling Center: <http://counseling.newark.rutgers.edu/>]

[Rutgers Counseling and Psychological Services–New Brunswick: <http://rhscaps.rutgers.edu/>]

If you are in need of **physical health** services, please use our readily available services.

[Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>]

[Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>]

If you are in need of **legal** services, please use our readily available services: <http://rusls.rutgers.edu/>

Students experiencing difficulty in courses due to **English as a second language (ESL)** should contact the Program in American Language Studies for supports.

[Rutgers–Newark: [PALS@newark.rutgers.edu](mailto:PALS@newark.rutgers.edu)]

[Rutgers–New Brunswick: [eslpals@english.rutgers.edu](mailto:eslpals@english.rutgers.edu)]

If you are in need of additional **academic assistance**, please use our readily available services.

[Rutgers University-Newark Learning Center: <http://www.ncas.rutgers.edu/rlc>

[Rutgers University-Newark Writing Center: <http://www.ncas.rutgers.edu/writingcenter>]

[Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu/>]

[Optional items that many faculty include:

- Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.

- Students must sign, date, and return a statement declaring that they understand this syllabus.]