

Statistics
Course Number: 22:960:608
Course Title: Business Forecasting

COURSE DESCRIPTION

At present time efficient forecasting is extremely important task of business managers. As the authors of our textbook stated “Forecasting situations vary widely in their time horizons, factors determining actual outcomes, types of data patterns, and many other aspects. Forecasting methods can be very simple such as using the most recent observation as a forecast (which is called the "naïve method"), or highly complex such as neural nets and econometric systems of simultaneous equations. Sometimes, there will be no data available at all. For example, we may wish to forecast the sales of a new product in its first year, but there are obviously no data to work with. In situations like this, we use judgmental forecasting. The choice of method depends on what data are available and the predictability of the quantity to be forecast.”

The overall objective of this course is to introduce students to both technical and managerial issues and implications for business forecasting. Lectures will be complimented by laboratory exercises to expose students to practical applications of these concepts and technologies. The forecasting process includes data selection, selecting the appropriate mathematical and/or statistical method, and reporting and visualization of the obtained forecast. The course will cover all these issues and will illustrate the whole process by examples of practical applications.

Course material will be placed on the course website. The address and access rules of this site will be announced during the first lecture.

COURSE MATERIALS

1. Hyndman, R.J. and Athanasopoulos, G. (2013) Forecasting: principles and practice. OTexts: Melbourne, Australia. <http://otexts.org/fpp/>.
2. Business Forecasting, (2009) 9th Edition, John E. Hanke and Dean Wichern, Pearson <https://www.pearson.com/us/higher-education/program/Hanke-Business-Forecasting-9th-Edition/PGM58861.html>

Software used: R. Students are expected to download and install R and R Studio on their own computers.

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 business theory and practice in the field of business forecasting.

Students who complete this course will demonstrate:

- a) Mastery of fundamental business forecasting concepts and an ability to integrate and apply these concepts to resolve practical business problems.
- b) Proficiency at analyzing and interpreting numerical data to resolve practical business forecasting problems.

- **Ethical Judgement.** Students will use reasoned and ethical judgment when analyzing problems and making decisions.

Students who complete this course will demonstrate:

- a) Recognition of ethical dilemmas in business forecasting.
- b) To critically evaluate business forecasting scenarios and develop innovative and ethical solutions

- **Critical Thinking Skills.** Students will be able to understand complex business situations and provide solutions to improve current business practices.

Students who complete this course will demonstrate:

- c) Ability to identify problems in a situation.
- d) Ability to find innovative solutions.

- **Persuasive communication.** Students will be effective communicators.

Students who complete this course will demonstrate:

- e) Ability to construct clear, concise, and convincing written business communication.
- f) Ability to construct and deliver clear, concise, and convincing oral business communication.

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

- **Lectures.** Besides delivering basic concepts, technology, and processes followed in data analytics, the lectures focus on various business application areas, such as finance, marketing, sales, and inventory, and explain how analytics problems can be formulated and solved.
- **Labs.** Several required labs in R will be assigned in this class for students to acquire experience in using analytics software that can be applied in future coursework and career. Each lab will deal with one or more functional areas in real business and require the use of data analytics technologies
- **Homeworks and Exams.** Basic data analytics concepts will be tested, and several data analytics implementation cases will be studied for students to gain some experience on real business problems.

After completing the course, students will be able to:

- Become familiar with the basics of statistical learning and data mining.
- Understand both supervised and unsupervised analyses.
- Understand the common data analysis techniques such as classification, clustering, association analysis, and outlier detection.
- Have the ability to clean data and prepare it for analysis.

Have the ability to analyze data using common data mining tools such as R.

PREREQUISITES

Some basic knowledge of statistics and calculus.

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 for more details.

ATTENDANCE AND PREPARATION POLICY

Expect me to attend all class sessions. I expect the same of you. If I am to be absent, my department chair or I will send you notice via email and Canvas as far in advance as possible. If you are to be absent, report your absence in advance at <https://sims.rutgers.edu/ssra/>. If your absence is due to religious observance, a Rutgers-approved activity, illness, or family emergency/death and you seek makeup work, also send me an email with full details and supporting documentation within 3 days of your first absence. Explain other aspects of your absence policy in detail; it will save you trouble later.

For weather emergencies, consult the campus home page. If the campus is open, class will be held.

Grade performance is a demonstrated function of attendance, preparation and participation. You can get behind very easily by skipping classes, resulting in a poor understanding of the material, which will show up as a poor grade for the class. Any class sessions missed by the student are the student's responsibility to make up, not the instructor's. **Late arrival that causes disruption**, early departure that causes disruption, excessive conversation among students (a disruption in its own right), inappropriate use of electronic devices that cause disruptions, and other actions that disrupt the classroom **are unacceptable**. The attendance sheets will be distributed at the beginning of the class and late arrival will could be equivalent to the missed class.

CLASSROOM CONDUCT

It will be no cold calling; all participation is voluntary.

Intention to contribute to the class discussion should be flagged by hand-raising.

Cell phones are not permitted in the class for calling but you can use them if you need to access online resources for this subject. The laptops are permitted for accessing the online resources of this subject.

The bathroom breaks are permitted during the class but not during the exams.

The food & drink are permitted.

Quiet side conversations are permitted during the class discussion, not during my lecture.

EXAM DATES AND POLICIES

There are 2 exams in this course: midterm and final. See course schedule for dates of these exams.

During exams, the following rules apply:

- If you have a disability that influences testing procedures, provide me an official letter from the Office of Disability Services at the start of the semester.
 - No cell phones or other electronics are allowed in the testing room.
 - You must show a valid Rutgers photo ID to enter the room and to turn in the exam.
 - Alternate seating; do not sit next to another student or in your usual seat.
 - Use the bathroom prior to the exam start; bathroom breaks, if essential, will be escorted.
 - You must sign your exam papers and Home Works, providing your Family Name, First Name, Section Number and Program code.
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GRADING POLICY

Assessment:

Midterm Exam	35%
Final Exam	40%
HW 1 (Project 1)	10%
HW 2 (Project 2)	10%
Class Attendance/Participation	5%

The final grade will be based on the class curve, which will depend on the overall class performance. However, the tentative **necessary conditions** of score intervals for grades are as follows (**before** class participation score is added):

A, A-:	upper 90% - 95% (tentative curve: A upper half, A- lower half in this interval)
B+, B, B- :	75% - 89% (tentative curve: B+ upper, B middle and B- lower third in this interval)
C+, C, C-:	60% - 74% (tentative curve: C+ upper, C middle and C- lower third in this interval)
D:	50% - 59%
F:	below 49%

Please note that this grade scheme is **tentative** and the final grading scheme will be based on the scores distribution after the final exam.

There will be no extra credit assignments, quizzes, or exams. Therefore, please plan to put in your best effort right from the start. Your final grade is not subject to negotiation. If you feel I have made an error, submit your written argument to me within one week of receiving your final grade. Clarify the precise error I made and provide all due supporting documentation. If I have made an error, I will gladly correct it. But I will adjust grades only if I have made an error. I cannot and will not adjust grades based on consequences, such as hurt pride, lost scholarships, lost tuition reimbursement, lost job opportunities, or dismissals. Do not ask me to do so. It is dishonest to attempt to influence faculty in an effort to obtain a grade that you did not earn, and it will not work.

The grades for all assessment components will be posted at the canvas's grade center after they are marked.

COURSE SCHEDULE

The Home Work submission dates are tentative and could be set for the later dates if necessary.

Week	Topic	Items due
1	Introduction to Forecasting	
2	Forecaster's toolbox	
3	Judgmental forecasts	
4	Simple regression 1	Home Work 1 announced
5	Simple regression 2	
6	Multiple regression 1	
7	Multiple regression 2	Home Work 1 due
8	Midterm exam	
9	Time series decomposition	Home Work 2 announced
10	Exponential smoothing 1	
11	Exponential smoothing 2, ARIMA models 1	Home Work 2 due

12	ARIMA models 2	
13	Advanced forecasting methods	
14	Final exam	

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.

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

[Rutgers University-Newark ODS phone (973)353-5375 or email 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]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email 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]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email 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 . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at 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]

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]

[Rutgers–New Brunswick: 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.]