Business Analytics and Information Technology
Course Number: 33:136:486
Course Title: Optimization Modeling

COURSE DESCRIPTION

We frequently have to make decision in real life so that we achieve our goals. Many times that involves making choices, sometimes hard, among available alternatives. Almost always we are limited by some of the resources that we need to achieve our goals, and our decisions are about the "best" utilization of these resources in order to achieve our goals. Optimization is an area that offers tools and techniques to formulate models for our decision problems. In this course we are going to learn some of the basic types of models, a high level modeling language to encode our models in a computer interpretable way, and the use of professional optimization packages to solve our models in order to obtain the "best" possible decisions.
The course is self-contained supported by weekly handouts. It is highly interactive, with lots of homework assignments. We learn together modeling techniques, AMPL encoding, and the use of the solver packages via a series of examples. AMPL is a high level modeling language that allows us to formulate even complicated mathematical optimization models in an elegant and short way. The course utilizes full versions of top of the art solver packages, that are made available by AMPL Inc., in time limited course packets, which are distributed via the course's canvas site.

COURSE MATERIALS

- Textbook(s): AMPL: A modeling language for mathematical programming. See http://www.ampl.com/ - Check Canvas and your official Rutgers email account regularly. Weekly handouts are posted every week before class.

LEARNING GOALS AND OBJECTIVES

This course is designed to help students develop skills and knowledge in the following area(s): Analyze decision problems and available data; build optimization models for certain standard types of problems, encode these problems in AMPL and solve them by the available solver package that includes CPLEX, XPressMP, and other state for the art optimization software.

- Students who complete this course will demonstrate the following: The ability to analyze real life decision problems, evaluate the data need for the decision maker, and interpret solutions provided by optimization software.

- Students develop these skills and knowledge through the following course activities and

assignments: By following the class regularly, participating in the common model building and solving activity, and by working on the weekly homework assignments.

PREREQUISITES

The course requires 33:623:386 OPERATIONS MGT or 33:136:386 OPERATIONS MANAGEMENT.

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, indicate it in your email to me and provide supporting documentation.

CLASSROOM CONDUCT

Be present, ask questions when you feel so, answer questions when asked. Please turn off your microphone, and turn it on only when asking questions (in order to minimize static noise.) Please join the class on time. Late logins are not only disruptive, but also may cause you miss the most important

parts/remarks. Please submit all assignments and exams on time, via email to me. Late assignments will

NOT be considered.

EXAM DATES AND POLICIES

There are 2 exams in this course: Midterm in normal class time, and a Final Exam the time and date of which will be determined later, to conform with fast changing university directives. All exams are open book, and require the submission of solutions by the end of the exam via email to me (make sure I can read what you submit; AMPL codes must run on computer as they are.) All exams will be individualized and made available via the course's canvas site.

GRADING POLICY

Course grades are determined as follows: All homeworks and exams are graded on a scale of 0 – 100. The final score is the weighted average of the exams and the average of homeworks. The average of homeworks count as 30%, midterm exam counts as 30%, and the final exam is worth 40%. The exams may have problems to earn extra points. When computing the average homework score one of the weakest (or missed) homework scores will be discounted.

Grading will be based on the average score according to the following scale:
A 91+
B+ 86-90
B 76-85
C+ 71-75
C 61-70
D 51-60
F 0-50

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.]