BAN 7850: Modeling and Simulation for Business Decisions

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Virtual Hours: TBD
Zoom-Class Hours: TBD
Class Room: Virtual

Contents

1 Required and Recommended Materials

Required Textbooks:

- None. We will be using a collection of papers and lecture to deliver this course.

2 Course Description

This is a Masters level course designed to enhance students' ability to make decisions based on data. It provides the understanding and technical expertise to create and fit models that fit the business situation, use the models to create simulations to generate predictions and to use the simulation results for better decision making.

3 Prerequisites

You should have a solid understanding of Algebra, Precalculus, Set Theory, Statistics, and Calculus.

4 Course Format

This course will leverage a combination of solving by pen and paper techniques, as well as leveraging software to solve simulation-based problems. The standard format for this course involves two types of class sessions. The in-person session will comprise of primarily lecture and some discussion. The virtual session will comprise of videos and hands-on workshop style lecture. You will be required to complete the workshop at home.

5 Course Objectives

1. Understand the different types of simulations
2. Identify when to design and leverage a simulation
3. Learn to design a simulation using software to solve a business problem.

6 General Course Policies

1. Please adhere to professional behavior in class. In our case, this will be conducted over Zoom. Professional behavior over Zoom entails muting your microphone until you have a question to ask, and not interrupting others.

2. Important announcements will be made in class and on Blackboard. So please make sure you are attending class and checking Blackboard! I ask everyone to check their email/Blackboard a MINIMUM of 30 minutes before class in the event of a last minute cancellation.

3. Final course grades are final. Let me repeat this. **Final course grades are final!** Changes will only be made if there is a mistake in the calculation of the final grade, but legitimate evidence suggesting the contrary must be presented to the professor. "Legitimate" constitutes the use of the professor's calculation in grade mismatching with the grade received. See below for more detail. It does NOT include a mistake made on a particular assignment or exam or project. Please keep in mind that grades are NOT rounded. So if you receive a 89.99, this constitutes a B+, not an A-. Do NOT request me to change a grade due to the closeness of a letter grade. I'm informing you right now, this will not happen! Same for other grading boundaries.

4. Accommodating students with special learning needs: In accordance with the university policy, students with documented sensory and/or other learning disabilities should inform the professor, so that their special needs may be accommodated. Please let me know IMMEDIATELY following the first lecture.

5. As you may know, it is against university policy to cheat. It is a very serious violation of academic integrity. Please note that if cheating of any kind is observed in/out of the class, you will be reported to a higher authority in accordance with university policy on academic dishonesty.

6. I do not give extra credit just because you are falling behind. Please do not request me to do so.

7. All course material is posted on Blackboard. Our videos are posted on our YouTube playlist.

8. It is YOUR responsibility, not mine, to keep track of your grades. With that said, ensure that you use the formula indicated below to get an idea of your standing in my course. The "Total Score" grades on Blackboard **do not** properly reflect your grades. In order to determine your grade in the course, you must use the equation indicated below in this syllabus. Failure to keep track of your own grade is not an excuse for additional points, extra credit or additional revision on assignments outside the grace period for review for said assignments. It also is not a valid reason to contest a final course grade. If you receive a grade of F at the end of the semester, please keep in mind that this is not reason for me to change a final grade due to your lack of supervision of your own grade. If you need me to clarify or project what your final grade will be, or give you a comment on your progress in the course, I will be happy to do so, but YOU MUST first initiate that type of discussion with me, and do so **well before the semester ends**.

9. ALL submissions of anything in this course are digital. Furthermore, **ALL documents MUST be of PDF file format upon submission**. **DOC, TXT, DOCX, etc will NOT be accepted as valid submissions**. I have a hard absolute policy with this. So please, remember, don't let your hard work result in a 0 all due to you not submitting a PDF. We live in the 21^{st} century, and ALL modern operating systems have the easy ability to

convert any of the aforementioned types into a PDF format. HENCE, please make sure that submissions are indeed in PDF format. Last, and most importantly, hard-submission (paper-format) WILL **NOT** be accepted as a valid form of submission.

7 Evaluation

Problem Sets (2 Total)	25% each
Final Project	50%

8 Blackboard

All submissions for everything are conducted through blackboard. Make SURE you have access to this! Everything will equally be posted on blackboard. Another side-note, please DO NOT EMAIL ME via blackboard. If you need to email me, please do so DIRECTLY from your WPUNJ email account.

9 Problem Sets

There will be a total of 2 problem sets. Each problem set will be assigned and posted on Blackboard Friday night at 11:59pm. Each problem set is due one week after being assigned. Please make sure to complete all of them in a timely manner. Each problem set comprises of 5 - 10 questions. Your are required to submit your solutions in PDF format or R (whichever the assignment calls for), with the document properly oriented (do not submit something that is sideways or upside down). If you have experience, or would like to gain experience, with LaTex, I have provided a template for you to use to type up your solutions. Please do not use Microsoft Word to submit solutions. If you feel uncomfortable using LaTex (http://www.overleaf.com), please just hand write (NEATLY!) your solutions, scan or take a picture of your solutions, and submit the resulting PDF. Please submit **only one** pdf document. You should be able to know how to put together multiple picture files into the same pdf document.

When you are finished writing your solutions, please post them on Blackboard **as a PDF document!**. I will grade them by simply marking a check or an "x". You will see the responses on blackboard. After seeing the responses, you have a second-chance opportunity to fix your mistakes. I will not tell you where it is wrong, you are tasked with figuring that out. Resubmit it to the same link, and I will offer a grade. In the first round of grading, you will receive either a 0, 1 or 100. 0 means that your submission did not follow the correct rules, and you will need to resubmit. NOTE: you are not allowed to be given a second chance if you submit incorrectly. A 1 indicates that you submitted correctly, but you got some of the problems wrong, and you will be offered the chance to resubmit the corrections. A 100 means that you got all the problems correct, and there is no need to resubmit a corrected version. After the second round of submission, I will subsequently grade them and post your final grades on Blackboard. We will cover solutions in the class **after** the due date. Due dates are always on the nights of virtual classes (Fridays).

10 Final Projects

You will be assigned a final project. The project will comprise of you leveraging your skillset in R to solve a simulation-based problem. More details on this are to follow with a formal write up of the project outline.

11 YouTube

Every class, make up class, extra course material and in some instances assignment solutions are recorded live using YouTube Live. While I offer this convenience to you, please do not be opportunistic of it. **You still are expected to attend class!**

12 Office Hours

I only hold hours by appointment. Please email me if you would like to meet out of class. I am fairly flexible. If we cannot agree on a time and day to physically meet, I may be able to meet virtually via Skype/Google Hangout/Zoom. Please just let me know a head of time if you plan to meet with me.

13 Course Schedule and General Syllabus Changes

13.1 Tentative Course Schedule

Lecture	Video Post Date	Topic
1	6/18/2020	Dynamic Systems
2	6/22/2020	Discrete-Event Simulations
3	6/25/2020	Agent-Based Simulations
4	6/29/2020	Markov-Chain Monte-Carlo Simulations
5	7/2/2020	Network Models, Simulation, and Complex Adaptive Systems