SYLLABUS

Applied Analytics & Predictive Modeling
44878 MGMT-4160-01 (4 Credits) / 43373 MGMT-6160-01 (3 Credits)
Spring 2020 Mondays and Thursdays 6:55 PM – 8:15 PM
Room Location: TBD
Websites: https://predictivemodeling.github.io/ **and Blackboard**
Prerequisites or Other Requirements: None.

Students may not receive credit for both the 4000 level and 6000 level versions of this course.

INSTRUCTOR

Instructor Name: Lydia Manikonda   **Office Location:** PITTS 1212
Tel. No.: 518-276-2768   **Email Address:** manikl@rpi.edu
Office Hours: Tuesday 2 PM – 4 PM via webex
(https://rensselaer.webex.com/meet/manikl)

Grader

TA Name(s):   Yuanyuan Liu   **TA Office Location:** PITTS 2224
TA(s) Email Address: liuy55@rpi.edu
TA Office Hours: Friday 11 AM – 1 PM via webex

COURSE DESCRIPTION:

Business analytics enables organizations to leverage large volumes of data in order to make more informed decisions. It encompasses a range of approaches to integrating, organizing, and applying data in various settings. This course develops an understanding of concepts in business analytics and data manipulation. In particular, through hands-on experience with a range of techniques students will learn to work with large data sets, analyze trends and segmentations and develop models for prediction and forecasting. This course is part of the MS program in Business Analytics and builds on foundations learned in the Fall semester. **Please see the attached file that describes how we will move forward virtually for the rest of the semester.**

COURSE GOALS/OBJECTIVES

1) Learn how to approach a new analytics challenge and ask the right questions
2) Construct and work with large data sets
3) Understand a range of models and techniques for data manipulation and prediction
4) Learn to visualize and present data insights

COURSE REFERENCE MATERIALS

Data Mining for Business Analytics in Python,
by Galit Shmueli, Peter C Bruce, Peter Gedeck, Nitin R. Patel
ISBN-10: 1119549841

STUDENT LEARNING OUTCOMES

For MGMT6160 through this course you are expected to:
    (1) Demonstrate an understanding of analytics-based problem solving and analytics thinking in the context of providing robust solutions for real world scenarios.
    (2) Be able to extract, match, transform, and clean data from a variety of sources.
    (3) Develop efficient predictions for business applications.
    (4) Apply ethical frameworks to the creation of models.
    (5) Translate research on state of the art deep learning to business applications.

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    (1) Demonstrate an understanding of analytics-based problem solving and analytics thinking in the context of providing robust solutions for real world scenarios.
    (2) Be able to extract, match, transform, and clean data from a variety of sources.
    (3) Develop efficient predictions for business applications.

COURSE ASSESSMENT MEASURES

Exam (40% total): in-class and individual test, covering the material studied up to this date.

Project (25%): a hands-on project will ensure you are able to apply what we have covered throughout the course. The project will be completed in groups of 3 students (with whom you are working on the assignments). More information will follow.

Assignments (30%): there will be three group assignments, shown in the schedule on the next page.

Extra active class participation (5%)

Research Translation Exercise (5%) – For graduate level students only

The student should read a recent research paper from a leading data mining conference (such as KDD) and explain the problem being solved, why the problem is important, the findings, and the business implications in non-technical language suitable for managers.

Missing an assignment or a test without prior approval from the instructor will result in a grade of zero (0). There will be no opportunities for extra credits or make-up assignments.

GRADING CRITERIA

All grading is out of 100%. The grading scale used for final course grades is: A (93-100); A- (86-92); B+ (82-85); B (78-81); B- (74-77); C+ (70-73); C (66-69); C- (60-65); F (below 60). There are no incomplete grades (I) in this class. Test grades and feedback will be given throughout the semester using the course management system (LMS).

MGMT6160 (3 Credits):

Component	Weight
Midterm exam	20%
Project	30%
Assignments	30%
Final Exam	10%
Class participation	5%
Research translation exercise	5%

MGMT4963 (4 Credits):

Component	Weight
Midterm exam	25%
Project	30%
Assignments	30%
Final Exam	10%
Class participation	5%

Students in MGMT6160 level cannot receive "D/D+/D-" grades.

Students should check LMS for grades on assignments.

ATTENDANCE POLICY

PLEASE DO NOT BE LATE TO CLASS. A maximum of 2 unexcused absences are allowed. Further absences will result in a 10% reduction of final overall score that is considered towards the final letter grade.

Therefore, the imperative clearly stated: each participant attends class fully prepared, willing and able to offer constructive criticism, provide goal-oriented analytic and synthetic insights, and encourage investigative dialectic. You earn your grade on participation through consistent, daily contribution. Merely "COMING TO CLASS" is not sufficient, but is necessary.

Simply put: Do not miss class hours or group meetings! Understandably, there are circumstances (e.g., job interviews, family matters, extracurricular activity, etc.) that may cause you to miss class; nevertheless, excessive absences will reduce your class participation grade. Notify the instructor and group IN ADVANCE of any planned absences (especially students who participate in extracurricular activities as representatives of RPI.)

ACADEMIC INTEGRITY

Student-teacher relationships are built on trust. For example, students must trust that teachers have made appropriate decisions about the structure and content of the courses they teach, and teachers must trust that the assignments that students turn in are their own. Acts that violate this trust undermine the educational process. The Rensselaer Handbook of Student Rights and Responsibilities defines various forms of Academic Dishonesty and you should make yourself familiar with these. Any violation of this policy will result in a penalty in accordance with Lally school guidelines. Depending on the severity of the violation, penalty will range from a grade of zero (0) on the specific grade component to failing the course. All violations will be reported to the Associate Dean for Academic Affairs. If you have any question concerning this policy before submitting an assignment, please ask for clarification.

ACADEMIC ACCOMMODATIONS

Rensselaer Polytechnic Institute strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on a disability, please let me know immediately so that we can discuss your options.

To establish reasonable accommodations, please register with The Office of Disability Services for Students (mailto:dss@rpi.edu; 518-276-8197; 4226 Academy Hall). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion."

Tentative Class Schedule

This is a tentative schedule and subject to change depending upon the progress of the class. Always check course website for the latest updates.

Session	Date	Topic	Deadlines
1	01/25	Course Introduction; Introduction to Python	
2	01/28	Introduction to Python and basics; RLT description	
3	02/01	Data cleaning and preparation	
4	02/04	Data cleaning and preparation; In-class case study	RLT submission
5	02/08	Structuring the dataset; Case description-1	
6	02/11	Dimensionality Reduction (PCA)	
President's day	02/15	NO CLASS	
7	02/18	Assignment-1 Presentations (five groups)	Assignment-1 due
8	02/22	Logistic regression; Case description-2	
9	02/25	Model evaluations;	
10	03/01	Assignment-2 Presentations (five teams)	Assignment-2 due
11	03/04	Decision trees	
12	03/08	Decision trees; Project Introduction	
13	03/11	K-NN algorithm	
14	03/15	1-slide project presentations;	**1st project presentation**
15	03/18	Data Preprocessing; Regression; Decision trees;	
16	03/22	Mid-term exam	**Mid-term exam**
17	03/25	NLP Applications; Case description-3	
18	03/29	Association rules	
19	04/01	Assignment-3 Presentations	Assignment-3 due
20	04/05	Association rules and market basket analysis	
21	04/08	2-slide project presentations	**Project report-1 due**
22	04/12	Guest presentation from industry	
23	04/15	Cluster Analysis; K-Means	
24	04/19	Cluster Analysis; K-Means	
25	04/22	Final project presentations	
26	04/26	Final project presentations	
27	04/29	Final project presentations	**Final project report due**
28	05/03	Final Exam	**Final exam**

COVID-19 Syllabus Guidelines – Lally School of Management

Students taking Lally School of Management classes are required to abide by the **COVID-19 code of conduct** below. This code will apply to any class that meets fully or partially in an on-campus physical classroom for in-person instruction.
Violations: Refusal to comply with the COVID-19 code of conduct will be treated just as any classroom disruption, which will receive request for immediate compliance, failing which the student will be asked to leave the classroom. Any further noncompliance will result in the dismissal of the entire class. All Covid-19 related violations will be reported by the instructor to the Compliance Officer at Lally School, and the Dean of Students. A student found to be in violation of the code, or required repeated reminders for compliance, will be asked to participate in all classes remotely. This is to protect their health and safety as well as the health and safety of their classmates, instructor, and the university community.

Masks: All students must wear a mask in classrooms and all public places including anywhere inside Pittsburgh building. Masks will be provided to the student by the Institute.

Traffic Flow and Social Distancing: Students and faculty will respect the need for social distancing. They are required to follow the traffic flow arrows posted in all rooms and buildings, including bathrooms and common areas.

In-Class Seating: Students should sit in the appropriate designated seating in the classroom. Students are not allowed to move furniture or sit in seats not designated by the Institute.

Cleaning of Spaces: Students are encouraged to clean the surfaces of the chairs/tables/desks they occupy before they sit down and as they prepare to leave. Cleaning and sanitizing solutions will be provided the classroom.

Students who are ill, under quarantine for COVID-19, or suspect they are ill should not come to class. All faculty will make every reasonable effort to accommodate the student's absence and will communicate that accommodation directly to the student. Students who need to report an illness should contact the Student Health Center via email or call 518-276-6287. For student seen off campus, a student may request an excused absence via www.bit.ly/rpiabsence with an uploaded doctor's note that excuses them.

Dear students,

I hope you all are doing well and I wish you well moving forward in the rest of the semester. <u>We all are together in this and we will do our best to ensure we learn and make the best use of this time</u>. At any point during the rest of the semester, you have any issues or concerns about the class or subject material related to this class, <u>please do not hesitate to reach out to me via Webex Teams or email. Please keep in mind that I am here for you</u> making sure you learn as much as possible. **Our first class will be online next week on January 25th 2021, at 6:55 pm ET.**

Email: manikl@rpi.edu
Webex: https://rensselaer.webex.com/meet/manikl
Class website: https://predictivemodeling.github.io/

Here, I have compiled a list of things that I am sure everyone is eager to know. Hope this will help clarify a lot of things. If you still have any other questions, ask me and I will keep updating this list.

Classes:

Question1: How are we going to hold online classes?
<u>We will be using Webex.</u> This is my meeting room -- https://rensselaer.webex.com/meet/manikl
I am planning to make the lecture as much interactive as possible with different polls during the lectures so that students can participate and be active. As always, lecture slides will be posted on the website or blackboard before the class. I will try my best to post it a day ahead of the class time slot. Alongside, <u>I will be sharing the recorded video</u> with the entire class right after the lecture. Class timings: Mondays and Thursdays 6:55 PM to 8:15 PM ET

Question2: I have questions during the online lecture. How should I ask you?
There is an option of "raise hand" on Webex. You can either use that or interrupt me by unmuting your call. I want you to ask as many questions as you can so that it helps me understand your thought process as well as where you currently stand. But please do not hesitate to interrupt the lecture if you have any questions.

Question3: What if Webex fails? What if these other alternatives fail?
We will use Google Hangouts as our <u>backup</u>. I will email you the details immediately if Webex fails. If Google Hangouts also doesn't work, we will use Skype. If Skype fails too, then we will use Youtube Livestream. No matter what happens with regard to technological challenges, we will lecture will be conducted during its scheduled time slot.

Question4: I am on the other side of the country or out of the country, how should I deal with the time difference?
<u>Please do let me know via email beforehand</u> if this is the situation with you so that in case I don't see you during the lecture I know what the issue is. Also, the lecture will be recorded so you can always use that for backup but I do hope you could join unless it's during the middle of the night or any other emergencies.

Case Study/Project Presentations:

Question5: How are we doing the project presentations?
I have been thinking about this a lot and I want to give you all as much flexibility as possible. In this regard, I would suggest you to choose **<u>either:</u>**
1) on-call presentation
    a. To do the on-class presentation, we will hear from each of the 3 students in a given team who can share their presentation.
    b. Please share your slides with me so that all the students and the TA as well as I can check out your slides.

   or

2) prerecord your presentation and we will watch it during your time slot
    a. Ensure that the presentation doesn't go beyond 20 minutes max.
    b. Please share your prerecorded presentation with the entire class.

Question6: We work together as teams; how do you think we should work now? Any tips?
I empathize with you over the current situation but let us try to be positive and use this opportunity to work in creative ways. Here are a few ways that I tried in my past outside-university collaborations:
1) Since this is not in-person, try to take some time and prepare a set of questions and possible solutions for the problem you are addressing.
2) Schedule a conference call with your teammates.
3) Also, if it works I would highly recommend you using Webex Teams to engage with your teammates. I started using webex teams recently and I am using it for my research projects and personally love it because of its features and through RPI it is free.
4) Please discuss who will work on what sections of the given work and try to have a constant communication with your teammates.
5) Try to have a document to summarize the minutes of discussion with a date so that when you talk again you know what is expected.

Question7: Evaluations?
Instructor and the TA will evaluate the presentations based on the technical quality, innovation, leveraging the learnings from the lectures. More details will be given as we resume the classes.

Question8: Grades?
Please check LMS for your grades.

Question9: I have questions for the TA. How can I meet the TA?
Please use the scheduled TA's office hours (Friday 11:00 am to 1:00 pm) or send an email (liuy55@rpi.edu). We are here to help you. Again, please do not hesitate to reach out to either one of us.

Question10: How do the office hours work?
Office hours will be conducted virtually via webex https://rensselaer.webex.com/meet/manikl I will be following the same office hours as listed above – Tuesdays 2pm to 3pm.

Exams:

Question11: Exam-1: Will be conducted on . It will be scheduled during our regular class hours.
Question12: Final exam: More details will be announced soon.