Rensselaer | LALLY SCHOOL OF MANAGEMENT

SYLLABUS

Introduction to Machine Learning Applications
Course Number: MGMT 6560-01/MGMT 4190-01
Credit Hours: 3/4
Semester/Year: Fall 2020
Room Location: TBD
Lecture Days/Time: Mondays and Thursdays 4:45 PM to 6:05 PM
Website: http://introml.analyticsdojo.com

INSTRUCTOR

Instructor Name: Jason Kuruzovich   **Office Location:** Pitt. 4th Floor *
Tel. No.: 518-698-9910   **Email Address:** kuruzj@rpi.edu
Office Hours: Tuesday 2:00 PM – 4:00 PM
*Office hours will be conducted via Webex Teams.

TEACHING ASSISTANT

TA Name: Shailesh Divey   **TA(s) Office Location:** Webex Teams
TA Office Hours: Tuesday 3:00 PM – 5:00 PM   **TA(s) Email Address:** diveys@rpi.edu

COURSE DESCRIPTION:

The widespread proliferation of IT-influenced economic activity leaves behind a rich trail of micro-level data, enabling organizations to use analytics and experimentation in both strategy and operations. This course provides a hands-on introduction to the concepts, methods and processes for machine learning from data, the foundation of artificial intelligence. We will learn how to manipulate data and apply machine learning models to business contexts. **Please find the attached document about the guidelines to students on how the classes will be continued virtually.**

COURSE GOALS/OBJECTIVES

The goal of this course will be to provide the technical foundation to enable students to become data scientists.

STUDENT LEARNING OUTCOMES

For MGMT6560 through this course you are expected to:
1. Demonstrate an understanding of analytics-based problem solving and analytics thinking in the context of machine learning models, deep learning, and big data.
2. Be able to extract, match, transform, and clean data from a variety of sources.
3. Develop machine learning 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.

For MGMT4966, through this course you are expected to:
1. Demonstrate an understanding of analytics-based problem solving and analytics thinking in the context of machine learning models, deep learning, and big data.
2. Be able to extract, match, transform, and clean data from a variety of sources.
3. Develop machine learning predictions for business applications.

COURSE REFERENCE MATERIALS

This book is recommended.

Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems 2nd Edition by Aurélien Géron

COURSE ASSESSMENT MEASURES

Assignments

You will have assignments associated with many classes. Be sure to check the course website and submit assignments via github. Preparing the case questions in advance is expected to help you participate and contribute to class discussion.

You will have 3 days of "late" time for sickness/deadline conflicts. You must send a slack message prior to the due date. After that there will be a reduction of 20% per day for each late day.

Quizzes

There will be several surprise quizzes through the semester to incentivize you to review the readings prior to class and arrive on time. The door will be locked at the start of class on a quiz day and you will receive a 0 if you arrive late.

Project

There will be an individual data assignment to be completed as part of the class. The overall goal is to undergo all stages of the data understanding, data munging, visualization, modelling, and further development of understanding.

Research Translation Exercise

The student should read a recent research paper from a leading machine learning conference (ICLR/NIPS/etc.) and explain the problem being solved, why the problem is important, the findings, and the business implications in non-technical language suitable for managers.

GRADING CRITERIA

All grading is out of 100%. Grade breakdown and feedback will be given through the course learning management system.

MGMT6560 (3 Credits):

Component	Weight
Assignments and Quizzes	15%
Research Translation Exercise	5%
Project*	25%
Midterm	25%
Final Exam	30%

MGMT4190 (4 Credits):

Component	Weight
Assignments and Quizzes	20%
Project*	25%
Midterm	25%
Final Exam	30%

Students in MGMT6560 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 Homework/Lab grades.

Labs are designed to be worked on during class time in a collaborative environment in which you each help one another. We have very different levels of technical expertise in the class, and it is important to work together on the labs to help one another in a classroom environment. While you may be able to complete the work at home by yourself, in doing so you will be robbing your classmates of your expertise. I will consider helping behaviours during the class as part of the participation component of the class.

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.)

OTHER COURSE POLICIES

After the add deadline, assignments up to 24 hours late will have their grade reduced by 25%; assignments up to one week late will have their grade reduced by 50%. After one week, late assignments will receive no credit. Please turn in your assignment early if there is any uncertainty about your ability to turn it in on time.

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 and the Graduate Student Supplement (For Graduate courses) define various forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student's own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration. Submission of any assignment that is in violation of this policy will result in a **grade of zero will be given on the first assignment where a violation is detected, and the infraction will be reported to the Associate Dean for Academic Affairs. If there is a subsequent infraction the student will receive a grade of F for the course**.

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."

COVID-19 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.

COURSE CALENDAR FALL 2020

This is a tentative schedule and subject to change depending upon the progress of the class.

Week	Session	Date	Day	Topic
1	1	8/31/20	Mon	Course Overview & Introduction to the Data Science Lifecycle
1	2	9/3/20	Thu	Python Basics
2		9/7/20	Mon	Labor day – no class
2	3	9/8/20	Tue	Python Basics (First in Person Class, Tuesday follow Monday Schedule)
2	4	9/10/20	Thu	Python conditionals, loops, functions, aggregating.
3	5	9/14/20	Mon	Python conditionals, loops, functions, aggregating (continued)
3	6	9/17/20	Thu	Python visualization, data manipulation , and feature creation.
4	7	9/21/20	Mon	Python visualization, data manipulation , and feature creation (continued)
4	8	9/24/20	Thu	Overview of Modeling
5	9	9/28/20	Mon	Overview of Modeling
5	10	10/1/20	Thu	Modeling evaluation
6	11	10/5/20	Mon	Python and Regression
6	12	10/8/20	Thu	Python and Regression
7		10/12/20	Mon	Columbus day – no class
7	13	10/15/20	Thu	Unsupervised Models
8	14	10/19/20	Mon	Unsupervised Models
8	15	10/22/20	Thu	Text and NLP
9	16	10/26/20	Mon	Time Series Analysis
9	17	10/29/20	Thu	Time Series Analysis
10	18	11/2/20	Mon	Text and NLP
10	19	11/5/20	Thu	Advanced supervised models
11	20	11/9/20	Mon	Advanced supervised models
11	21	11/12/20	Thu	Image Data and Deep Learning
12	22	11/16/20	Mon	Image Data and Deep Learning
12	23	11/19/20	Thu	Automl and Modeling Packages
13		11/23/20	Mon	Thanksgiving
13	24	11/26/20	Thu	Automl and Model Search
14	25	11/30/20	Mon	Big Data
14	26	12/3/20	Thu	Big Data

15	27	12/7/20	Mon	Final Presentations
15	28	12/10/20	Thu	Final Presentations
		TBD		Final Exam