**Introduction to Machine Learning**

The goal of the course is to introduce the students to the main concepts of machine learning and provide working knowledge of tools available in the matlab Statistics and Machine Learning toolbox. The emphasis will be on supervised learning, both for classification and regression. Major financial applications for such problems will be considered. Important metaheuristics for machine learning will be introduced. Finally, students will get an insight on the foundations of neural networks methods, that will be covered in a more advanced course in Deep Learning.

Instructor: Dmitry Udler dmitryudler@hotmail.com

**Instead of a standard text** we will use matlab documentation for the Statistics and Machine Learning Toolbox. It is well written and has a balanced mix of theory and practical guidance.

Additional text*: J. Smith Machine Learning with Matlab: Supervised Learning and Regression”, Create Space Independent Publishing Platform, 2017.*

Additional text: *M. Paluszek and S. Thomas, “Matlab Machine Learning”, Apress, 2017, New Jersey.*

Also, additional specialized papers will be provided through BB.

Lectures every Thursday 8 to 5 pm.

Grading: 10% class participation and 90% homework.

**Reminder: one of the main benefits of taking a course as opposed to simply reading the textbook is the ability to ask questions and to receive assistance. Take advantage of it.**

COURSE OUTLINE

This course outline is tentative and is subject to change by the instructor.

The Concept of Machine Learning and its Connection to Other Disciplines: Statistics, Optimization

“Deep Learning” vs. “Shallow Learning”

Supervised and Unsupervised Learning

Problem formulations for Supervised Learning: classification and regression

Nomenclature of Machine Learning

Loss function

Feature Selection

Cross Validation

Performance measures

Specific Methods

Logistic Regression

Decision Trees

Naïve Bayes

SVM

Linear SVM

Nonlinear kernels

SVM optimization

Ensemble Methods for Machine Learning:

Boosting

Random Forest

Bagging

# University Policy regarding Disability Services

If you are a student with a documented disability and require academic accommodations, you need to register with the Office of Disability Services for Students (ODS) in order to request academic accommodations for your courses. Please contact the main ODS office at Rose Hill at 718-817-0655 to arrange services. Staff at ODS can walk you through the process and arrange appointments depending on which campus you take courses at. Accommodations are not retroactive, so you need to register with ODS prior to receiving your accommodations. Please see me after class or during office hours if you have questions or would like to submit your academic accommodation letter to me if you are already registered for accommodations with Fordham. Therefore, if you are not already registered with the Office of Disability Services, please make an appointment to register ASAP and bring me your accommodations letter as soon as