MATH 260, Spring 2020
Department of Mathematics
Tufts University

Course:	Foundations of Statistical and Machine Learning
Location/Time:	BP 005, Mondays and Wednesdays 6:00-7:15pm (Block M+)
Instructor:	• James M. Murphy • Email: JM.Murphy@tufts.edu • Office: Bromfield-Pearson 208 • Office hours: Mondays, 3:00-4:00 pm, Wednesdays 3:00-4:30 pm and by appointment • Course webpage: https://jmurphy.math.tufts.edu/Teaching/Spring2020/MATH260
Description:	This graduate course is a mathematical and statistical treatment of machine learning and related aspects of analysis, statistics, and probability theory. The emphasis is on theory, though some coding exercises will be given. Topics include: probably approximately correct learning, Rademacher complexity, VC-dimension, empirical risk minimization, structural risk minimization, cross validation, support vector machines, kernel methods, reinforcement learning.
Text:	*Foundations of Machine Learning*, Mohri, Rostamizadeh, Talwalkar. Both are available for free on the respective authors' websites. Course notes will be posted after each lecture on the instructor's website.
Prerequisites:	Linear algebra (MATH 70 or 72), real analysis (Math 135-136), and probability and statistics (MATH 165-166), or permission of instructor.
Assignments:	▶ **Homework**: Every other week, homework will be assigned. It will generally be due on Wednesday at the start of lecture. Each homework assignment counts equally, regardless of number of questions. All assignments will be posted on the instructor's webpage. In aggregate, homework is worth 50% of the final course grade. ▶ **Final Project**: Students will complete a final project, which will involve a 20 minute presentation slide deck and a 10 page LaTeX write-up. The projects will be in groups of 2-3. The final project is worth

50% of the final course grade. The final project is due by midnight on May 6.

REMARKS:

- Late homework is not accepted.
- Working in groups on homework and to study is *strongly encouraged*! Working together is perhaps the fastest way to make progress on challenging questions.
- Cheating will not be tolerated. Anyone suspected of academic dishonestly will be reported to the mathematics department chair and their dean.
- Due to holidays and university breaks, there are no classes or office hours on the following days: January 20, February 17, March 16-20, April 20. We will have class at the usual time on Thursday, February 20.