SI486L: Machine Learning and Data Science

Course Policy, Spring AY19

Coordinator: Assoc. Prof. Gavin Taylor, MI355, x3-6816, taylor@usna.edu

Course Description: Machine Learning is the study of mathematically making autonomous conclusions about new data given insight from previously-seen data. This course will cover a broad scope of machine learning and data science problems, including supervised learning, unsupervised learning, and reinforcement learning. Techniques will include parametric approaches, kernelized methods, and neural networks. Students will also be exposed to an introduction to learning theory and the mathematical underpinnings of modern machine learning.

Credits: 2-2-4

Learning Objectives:

1. Uh...

Student Outcomes:

Graduates of the program will have an ability to:
1. Analysis. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Implementation. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communication. Communicate effectively in a variety of professional contexts.
4. Ethics. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Teamwork. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

CS-6. Theory. Apply computer science theory and software development fundamentals to produce computing-based solutions.
IT-6. Requirements. Identify and analyze user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing based systems.

Textbook(s): Abu-Mostafa, Magdon-Ismail, and Lin. Learning From Data

Extra Instruction: Extra instruction (EI) is strongly encouraged and should be scheduled by email with the instructor. EI is not a substitute lecture; students should come prepared with specific questions or problems.

Grading Policy and Collaboration: The guidance in the Honor Concept of the Brigade of Midshipmen and the Computer Science Department Honor Policy must be followed at all times. See `www.usna.edu/CS/resources/honor.p`
Specific instructions for this course:

- Homework: There will be occasional homework assignments. These can be completed collaboratively. In my other classes, part of the purpose of homework is to force students to confront topics they do not understand; there is much less of that in this class. In contrast, this is an elective, for

people nearing the end of their major; you know when you do and do not understand concepts, and you will be responsible for taking proper action even without prompting from homework.

- Projects: There will be many projects involving programming a robot. These will be performed in groups of 2 or 3, and will end with an in-class demonstration. You may use any source for help, and discuss them with anybody, but **all submitted work must be your group's**, and all help must be documented.

- Exams: There will be two midterms and a comprehensive final. Should a make-up exam be needed, inform the instructor at least one week in advance.

- Participation: The class is designed as a project-heavy, collaborative experience. Participation is graded so that I can properly reward those who are on board with this. Letting your partner do the work will hurt you both on the exams, and in participation grades.

Classroom Conduct: The section leader will record attendance and bring the class to attention at the beginning and end of each class. If the instructor is late more than 5 minutes, the section leader will keep the class in place and report to the Computer Science department office. If the instructor is absent, the section leader will direct the class. Drinks are permitted, but they must be in reclosable containers. Food, alcohol, smoking, smokeless tobacco products, and electronic cigarettes are all prohibited. Cell phones must be silent during class.

Late Policy: Projects will not be accepted late without a *really* good reason. Homeworks may be submitted one day late, with a 30% subtractive penalty.
Grading: The breakdown of the final course grade will be:

- **25% Final Exam** - the final exam will be cumulative.

- **25% Mid-term Exams** (2) - Mid-terms are written, with no practical component. Bring a calculator, we do math in here.

- **40% Programming Projects** - Detailed instructions for the electronic submission will accompany each project. Much of our classtime will be dedicated to these projects, but they are not intended to be completely finished in class.

- **10% Homework and Participation** - The percentage of this which is homework will be determined based on the amount of homework I feel I have to give. More homework, higher percentage.