EECS 445: Introduction to Machine Learning

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Note: Times and locations for lectures, discussions and office hours are specified in the google calendar (linked via canvas).

Clickers: You will need to purchase a clicker for class participation (see details below) and are expected to bring your clicker to each class period. *Please address any questions regarding purchasing clickers to Computer Showcase.*

Textbook: Although the course does not have a required textbook, the following books are good references:

1. A Course in Machine Learning by Hal Daume III (available online)
2. Pattern Recognition and Machine Learning by Christopher Bishop (available online)
3. Machine learning: A Probabilistic Perspective by Kevin Murphy
4. Hands-on Machine Learning with Scikit-Learn and TensorFlow by Aurélien Géron
5. Mining of Massive Datasets by Leskovec, Rajaraman and Ullman (available online)
6. Reinforcement Learning: An Introduction by Sutton and Barto (available online)
7. Introduction to Multi-Armed Bandits by Aleksandrs Slivkins (available online)

Python: We will use python extensively for the coding assignments and projects in this course. We will hold (optional) tutorials through the course to acquaint you with relevant portions of python. Additionally, there are various python references available online. We will link to these in the tutorial notes.

Both course slides and additional materials will be posted online via canvas.

Prerequisites:

- (Enforced) EECS 281 and (MATH 214 or 217 or 296 or 417 or 419)
- (Advisory) STATS 250 or equivalent

General Info:

EECS 445 provides an introduction to machine learning, including: algorithms and applications.

Course description: Theory and implementation of state-of-the-art machine learning algorithms for large-scale real-world applications. Topics include supervised learning (regression, classification, kernel methods, neural networks, and regularization) and unsupervised learning (clustering, density estimation, and dimensionality reduction).

A detailed schedule for the class can be found on the Canvas page.

Course Format and Requirements:

It is very important to attend and participate in classes (both lectures and discussions).

A Piazza page has been established to help with discussion outside of class. Any question that is not private and might be of interest to other students in the class should be posted to Piazza. Please note that the staff might ask you to post your questions on Piazza if we feel it will be beneficial to other students. piazza.com/umich/winter2020/eecs445

For other questions, you can reach the course staff at: eecs445-staff@umich.edu. If you send the course staff an email that requires more than a few sentences of reply, you might be asked to come to office hours or set up an individual meeting. If you do not get a reply within 48 hours, please resend your email. The course staff will work very hard to be respectful of you. Please be respectful and professional in your emails. **Please do not contact the staff individually.** You may reach the course instructor at her email address listed above for matters that you wish to communicate directly with her.

Course Grading:

Homework	20%
Projects	20%
Midterm	25%
Final	30%
Clickers*	4%
Course Evaluation	1%

Below are the *guaranteed* grade thresholds: if your final raw score exceeds the threshold for grade X, your final letter grade will be X ***or better***. The actual thresholds will be determined after the final exam (but will be no higher than what appears below). A failing grade on the final exam is grounds for failing the course.

A: 94% and above
A-: 90%
B+: 87%
B: 83%
B-: 80%
C+: 77%
C: 70%

Grading Philosophy:

In any humanities or social science class, you must write clearly and concisely to get your point across. It is not sufficient that a correct argument appears *somewhere* in your answer, if it is also accompanied by incorrect or faulty reasoning. The same applies for this course: your responses must be *clear*, *concise*, and *correct* to receive full credit.

Components of Grade:

Homework Assignments (20%) + Projects (20%)

Homework assignments play an important role in the learning process. There will be 6 roughly biweekly assignments: homework HW1 - HW4, and two mini-projects. These will be due at 11:59PM on Tuesdays unless otherwise noted.

Late submission policy for homework and projects:
You have 3 late days to use over the course of the semester for all homework and 3 late days for projects. These will be strictly enforced and are meant to cover unexpected life events. **Use these wisely!** We will count late days in increments of days starting immediately. For example, suppose that you submit 15 minutes late. This counts as a late day and will decrease your remaining late days for that assignment type by 1. **No late submissions will be accepted after the 3 days have been used up**. Unfortunately, exceptions can only be made for emergency situations (e.g. family or medical), and **should be requested with as much notice as possible and/or be evidenced by documentation**. Please plan accordingly and/or be ready to provide documentation of medical appointment, etc.

Midterm (25%) and Final Exam (30%)

One in-class midterm and a cumulative final exam will be given. A large fraction of the questions on these exams will be similar to homework and class problems or very slight variations/extensions. Thus a good way to study is to make sure you know how to solve these problems.

Clickers (4%)

Throughout the course, several clicker questions will appear, with the main purpose being participation. Four percentage points of credit for clicker scores will be earned by students who answer at least **50%** of the questions. Otherwise, this portion of the grade will be proportionally equivalent to your final exam score. (I.e., the final exam will be worth 34% of your final grade.)

Course Evaluation (1%)

The course evaluation is important to us and counts 1% towards your final grade. Students will receive one point by submitting the midterm and the final course evaluations (0.5 points each) **and** uploading the receipts from the course evaluations to Canvas as separate assignments.

Other (Bonus Points)

Class participation is highly valued. Active and constructive participation in class and on piazza will gain you a bonus point as well. This will be determined at the end of the course.

Regrading Policy:

If a student feels that credit has been inappropriately allocated, then they should ask for a regrade. The student should submit these via gradescope. Regrade requests must be made within **one week** after grades for that assignment are released. You have at most 1 rebuttal per regrade request. Any exceptional policy for exam regrades will be specified separately.

*****No oral and/or e-mail regrading requests will be accepted*****

Students are cautioned that they have the possibility of both gaining and losing points (i.e., if the regrade determines that the answer was more incorrect than marked). Students are reminded that accuracy alone is not sufficient; the answer should also be clear.

Honor Code and Collaboration:

Unless otherwise specified in an assignment, all submitted work must be your own, original work. If you are referencing others' work, put it in quotes! If you are directly quoting, or building on others' writing, provide a citation. See the Rackham Graduate policy on Academic and Professional Integrity for the definition of plagiarism, and associated consequences.

Violations of the Honor Code will be taken seriously; Please see details: https://elc.engin.umich.edu/honor-council/

Students are **encouraged to collaborate** (except when taking exams). Please use Piazza to this effect and also to find other students to work with on assignments, i.e., create study/homework groups. However, when turning in work that benefited from a collaboration, the student must state that clearly. Students are expected to **write their solutions on their own** and **should not look at any other student's write-up**.

Course Technology Policy:

Personal use of cellphones and tablets is **not allowed** during class. Laptops can be used in class on mute only and for the sole purpose of taking notes. Usage of any other electronic devices can be distracting to your peers. If you need to attend to something during class time, feel free to step outside for a minute. Violators of this policy will be first given a warning and then asked to leave the classroom.

Student Sexual Misconduct

Policy Title IX prohibits discrimination on the basis of sex, which includes sexual misconduct — including harassment, domestic and dating violence, sexual assault, and stalking. We understand that sexual violence can undermine students' academic success and we encourage anyone dealing with sexual misconduct to talk to someone about their experience, so they can get the support they need. Confidential support and academic advocacy can be found with the Sexual Assault Prevention and Awareness Center (SAPAC) on their 24-hour crisis line, (734) 936-3333 and at sapac.umich.edu.

Alleged violations can be non-confidentially reported to the Office for Institutional Equity (OIE) at institutional.equity@umich.edu

Student Mental Health and Wellbeing

We want you to be successful in and outside of this class. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at (734) 764-8312 and caps.umich.edu during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at (734) 764-8320 and https://www.uhs.umich.edu/mentalhealthsvcs, or for alcohol or drug concerns, see

www.uhs.umich.edu/aodresources. For a listing of other mental health resources available on and off campus, please visit: http://umich.edu/~mhealth/

Accommodations for Students with Disabilities

If you think you need an accommodation for a disability, please let the course staff know at your earliest convenience by completing the online form:

https://docs.google.com/forms/d/e/1FAIpQLSfXuoyMxhQlWb5uwnCh0AvHK6JLO8vU7OwMiaNp2p7dCbM63Q/viewform?usp=sf_link

Some aspects of this course, the assignments, the in-class activities, and the way we teach may be modified to facilitate your participation and progress. As soon as you make any of the staff aware of your needs, we can work with the Office of Services for Students with Disabilities (SSD) to help us determine appropriate accommodations. SSD (734-763-3000; http://www.umich.edu/~sswd/) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. The course staff will treat any information you provide as private and confidential.

Exam Conflicts

Everyone is expected to take all exams at the scheduled times. The times of the exams can be found on the course schedule. It is departmental, college, and university policy that travel schedules and holiday activities **never** take precedence over exam schedules. Alternate exam will be given **only** in very *exceptional cases* such as serious illness or a similarly serious family emergency.

In a case of a conflict due to a university sponsored event (such as participation in a sponsored sports event or a competition) a university official in charge of the event should contact the instructors **at least three weeks** in advance to determine how the missing grade will be made up.

Note that end-of-term transportation matters, such as the availability of inexpensive air tickets, are **not** acceptable reasons for an absence.

Good luck!