CE477: Machine Learning
Department of Computer Engineering
Sharif University of Technology
Spring 2025: Sunday & Tuesday: 10:30-12:00

Instructors:

Hamid R. Rabiee
Office: CE-804 & DML (CE 803)
Office Hours: By Appointment (Through Email)
Office Phone: 6616-6683
Email: rabiee@sharif.edu
URL: `http://sharif.edu/~rabiee/`

Zahra Dehghanian
Office: DML (CE 802)
Office Hours: By Appointment (Through Email)
Email: zahraDehghanian97@sharif.edu
URL: `https://dml.ir/users/profile/329/`

Head TA:

Mahta Fetrat

Email: m.fetrat@sharif.edu
URL: `https://dml.ir/users/profile/333/`

Assistant Head TA:

Mahdi Mastani

Email: mahdi.mastani@sharif.edu
URL: `https://dml.ir/users/profile/341/`

Course Website:

`https://ml-sut.github.io/`
(UNDER CONSTRUCTION)

Online Lectures:

`https://vc.sharif.edu/ch/rabiee`

Prerequisites:

Engineering Probability and Statistics (40-181)
Linear Algebra (40-282)

Course Textbooks & References:

1. Pattern Recognition and Machine Learning, C. Bishop, Springer, 2006.
2. Machine Learning, T. Mitchell, MIT Press,1998.
3. An Introduction to Statistical Learning
4. Andrew Ng ML Course: `https://www.youtube.com/watch?v=jGwO_UgTS7I`
5. Instructor Handouts.

Grading:

Your grade will be based on your performance in Homework, Quizzes, Mid-Term, and Final Exam. The grade distribution will be as follows:

- Homework: 40%
- Quiz: 10%
- Mid-Term Exam: 20%
- Final Exam: 30%
- Class Activity* and Exam Bonus Question: 7.5% (Extra Points)

* Class activity includes writing summaries for classes and attending ML-Talk sessions.

Course Regulations

Homeworks:

Homework problems will be assigned on their designated dates and will be due approximately 10-14 days later. The problems may also cover material from the following week, so do not expect to complete the entire problem set immediately after it is released. Each homework will include both a theoretical and a practical part using Python. You are allowed 6 days of late submission without penalty during the entire semester, with a maximum of two days per homework. After this period, a 10% penalty will be applied for each additional day, and the maximum number of late days with penalty is two. No submissions will be accepted later than three days after the deadline including all kind of late submission. Homework must be submitted in .pdf format via the course page on the Quera website, with the following naming format:
HW[HW#]-[std#] (e.g., HW3-400100111)

Week	Date	Topic	Readings	Quiz	HW	Deadline
1	11/21	Course overview, and Review of Probability and Linear Algebra				
	11/23	Linear and Non-Linear Regression, Overfitting				
2	11/28	Linear and Non-Linear Regression, Overfitting (Cont.)				
	11/30	Bias, Variance, Regularization			HW1	
3	12/05	ML and MAP				
	12/07	Statistical Regression				
	12/10					HW1
4	12/12	Validation, Cross-Validation, Model Selection, Feature Selection				
	12/14	Linear Classifiers, Multi-class Classifiers				
	12/16				HW2	
5	12/19	Bayes Classifier		Q1		
	12/21	Logistic Regression				
6	12/26	Perceptron				HW2
	12/28					
7	12/28				HW3	
	01/17	SVM		Q2		
	01/19	SVM (Cont.)				HW3
	01/21	**Midterm Exam**				
8	01/24	Neural Nets			HW4	
	01/26	Decision Tree				
9	01/31	Instance-Based Learning		Q3		
	02/02	Instance-Based Learning (Cont.), Learning Theory				
10	02/07	Bagging, Boosting, AdaBoost				HW4
	02/09	Bagging, Boosting, AdaBoost (Cont.), PCA, ICA				
11	02/14	PCA, ICA (Cont.)			HW5	
	02/16	Clustering				
12	02/21	Clustering (Cont.)		Q4		
	02/23	Clustering (Cont.)				
13	02/28	Markov Decision Process, RL				HW5
	02/30	RL (Cont.)				
14	03/04	Deep Learning, CNN			HW6	
	03/06	RNN				
15	03/11	Attention, Transformer		Q5		
	03/13	NLP, LLM, VLM				
	03/20					HW6
	04/03	**Final Exam**				

Quizzes:
A quiz will be given after each homework, covering the topics up to that homework.

Practical Homework Presentation:
There will be an online session after each homework during which any issues with the theoretical problems will be addressed, and students will be randomly selected to explain their code. These sessions will be held every Friday at 6:00 p.m.

Statement on Collaboration, Academic Honesty, and Plagiarism:
We encourage working together whenever possible on homework. An acceptable form of collaboration is to discuss possible approaches with your classmates, but each student should fill in the details and write their own solution *independently*. It is unacceptable to copy someone else's solution. We discourage, but do not forbid, the use of materials from prior terms that students may have access to. However, when writing up your solutions, these materials must be set aside, and copying from others' work is not allowed. At the top of each homework submission, you should briefly list all sources of information you used, excluding standard course materials like textbooks, lectures, etc. A brief note such as "Did homework with ABC and ABD in study group" or "Looked at old solution for Problem 4" would be sufficient. In addition to moral considerations, this helps the TAs in grading your submissions. There will be a zero-tolerance policy for cheating and copying homework. If you are caught once, you will receive a zero for the task at hand. If you are caught a second time, you will fail the course. In general, we expect students to adhere to basic principles of academic honesty. Presenting others' work as your own or cheating during exams will not be tolerated.

Midterm Exam: The midterm exam is scheduled for Farvardin 21th, 9:00-11:00 AM.

Enjoy the course & Good luck :)