

# CS688 Machine Learning Syllabus

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## Time and Location

4:30-7:10 pm Wednesday  
@ Planetary Hall 206

## Instructor

Fang-Yi Yu

1:00-2:00 pm Wednesday  
@ Research Hall 350

## GTA

Wenjie Xi

2:15-3:15 pm Friday  
@ ENGR 4456

## Course Overview

Machine learning uses computational methods and information to improve performance or accuracy. In this course, we will explore various machine learning settings that can access different information, supervised, unsupervised, online, and reinforcement learning, and we will study the computational methods to process and utilize information efficiently. Finally we will study the possibilities and limitations of machine learning.

## Recommended Reading

Although there is no required textbook, we highly recommend the following books

- Pattern Recognition and Machine Learning ([PRML](#))
- Machine Learning: A Probabilistic Perspective ([Murphy](#))

## Prerequisite

CS 580 or 584.

In the first homework, we will review linear algebra and probability.

## Tentative Schedule

<b>Week</b>	<b>Subject</b>	<b>Deliverables</b>
Week 1	Introduction	HW0 out
Week 2	Classification and regression	
Week 3	Bias-variance tradeoff, model selection	HW1 out, HW0 due
Week 4	Generative and discriminative models	
Week 5	Support vector machines, regularization	HW2 out, HW1 due
Week 6	Kernel, duality, and convex optimization	
Week 7	Transparency, Fair, and Privacy	HW3 out, HW2 due
Week 8	<b>Spring break</b>	
Week 9	<b>Midterm</b>	
Week 10	Neural network	checkpoint due
Week 11	Unsupervised learning	HW3 due, HW4 out
Week 12	Ensemble methods	
Week 13	Online and reinforcement learning	HW4 due
Week 14	Final project presentation	
Week 15	Final project presentation	Final project report due

## **Grading Policy**

We'll calculate your final grade based on the following components. There will be no make-up or extra-credit assignments at the end of the semester; your grade should be a measure of your semester-long progress.

- Homework: 40% (best four out of five)
- Midterm 25%
- Final project 30%
- Participation 5%

## **Assessment**

- A+ (score  $\geq$  98.0% or rank  $\geq$  5%)
- A (score  $\geq$  92.0% or rank  $\geq$  10%)
- A- (score  $\geq$  90.0% or rank  $\geq$  20%)
- B+ (score  $\geq$  88.0% or rank  $\geq$  30%)
- B (score  $\geq$  82.0% or rank  $\geq$  40%)
- B- ( $\geq$  80.0%)
- C+ ( $\geq$  78.0%)
- C ( $\geq$  72.0%)
- C- ( $\geq$  70.0%)
- D ( $\geq$  60.0%)
- F ( $<$  60.0%)

## **Homework Policy**

Activities and assignments in this course will regularly use the [Blackboard](#). You may submit multiple files to Blackboard prior to the deadline, but only the last version will be graded. You can and should download your submission to verify if the file is in a working copy.

There will be five homework assignments and the score of the lowest one will be dropped. Each homework assignment has a posted deadline, and late submission is not accepted. Assignments are considered individual efforts, and no sharing and discussion of problem solutions are allowed with anyone except the TAs or the instructor.

If you feel points have been incorrectly deducted, contact the grader: TA for homework and instructor for the midterm. Contesting of grades on any/all submissions must be requested within one week of receiving the grades. No grade changes will be considered after that deadline.

## **Midterm Exam**

Midterm covers the first six weeks of the material. You are allowed one 8.5x11in sheet of notes, front and back. There will be no make up for the exam unless previously arranged (well in advance)

## **Final project**

The final project will be graded in groups of size 3-4 people. The project will consist of the following:

1. Checkpoint, a written report that contains a research topic, a brief introduction, and a literature review of the topic,
2. Presentation in the class,
3. Final report that includes the research topic, introduction, literature, results, and discussion.

## **Honor Code**

This class enforces the [GMU Honor](#) and the more specific [honor code policy](#) special to the Department of Computer Science. You will be expected to adhere to this code and policy.

## **Disabilities**

If you have a documented learning disability or other condition which may affect academic performance, make sure this documentation is on file with the [Office of Disability Services](#) and talk to the instructor about accommodations.