

# CSE 474/574 Fall 2021 Course Organization

## Introduction to Machine Learning

Instructor: Sargur Srihari

<http://www.cedar.buffalo.edu/~srihari/CSE574/index.html>

CSE474LEC-B(19698) and CSE574LEC-001(19687)-M, W 10:20-11:40am

### Description:

The goal of a machine learning program is to learn to perform specific tasks from examples rather than being explicitly programmed by humans. It is the modern approach to creating Artificial Intelligence. The course covers both supervised and unsupervised learning. In the former, tasks such as regression and classification are performed using labeled samples. In the latter, tasks such as clustering and representation learning are performed using unlabeled data sets. The course covers necessary concepts of machine learning such as probabilistic models, activation functions, loss functions, optimization, gradient descent, and back propagation. Students implement projects using Python and libraries such as Tensorflow, Keras and Pytorch.

**Learning Outcomes:** Understand machine learning concepts and programming techniques useful to create intelligent systems.

### Prerequisites:

Linear algebra, calculus, probability theory and programming in Python

### Reference Material:

Course slides for each week's lectures are posted online at UB Learns. They are a subset of publicly available slides at <http://www.cedar.buffalo.edu/~srihari/CSE574>. This will be the primary reading material. In case of clarifications needed, you can refer to the following book: *Pattern Recognition and Machine Learning* (PRML) by Chris Bishop (Springer 2006)

**Instructor:** Sargur N. Srihari, 338C Davis Hall Email: [srihari@buffalo.edu](mailto:srihari@buffalo.edu)

**Teaching Assistants:** Mihir Hemant Chauhan [mihirhem@buffalo.edu](mailto:mihirhem@buffalo.edu)  
On-line office hours: Tuesday, Thursday: 1PM to 2PM.

### Course Details

1. You are expected to attend all lectures. Attendance will be noted on-line.
2. There will be a quiz each Monday.
3. There will be brief breakout sessions each Wednesday.
4. Three programming projects: (i) Logistic Regression (2-class problem in Python) (ii) Neural Networks (10-class problem in Tensorflow) and (iii) Reinforcement Learning.

### On-line Tools

**Zoom:** <https://buffalo.zoom.us/j/95858856446?pwd=Z2FiTWlGV1JoTjJydVRBWkpzdWgwUT09>  
pwd: ML4574

1. *UB Learns:* Lecture slides posted under Course Documents. Projects under Course Assignments.
2. *Piazza:* To enable discussions. Sign-up at [piazza.com/buffalo/fall2021/cse474574/home](https://piazza.com/buffalo/fall2021/cse474574/home)

5. Please read department policy on academic dishonesty; this will be enforced strictly.

### Important Dates

### Grading

Monday Aug 30	First Day
Monday, Sep 6	No class (Labor Day)
Wed, Nov 24	No class (Thanksgvng)
Wednesday, Dec 8	Last Lecture
Fri, Dec 18	Final Exam

Quizzes	20%
Final	20%
Project 1	15%
Project 2	20%
Project 3	20%
Attendance	5%

## CSE 474/574 Fall 2021 Course Syllabus

Introduction to Machine Learning

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Lecture Dates	Readings: Lecture Slides +	Topics	Lecturer	Comments and Projects
Aug 30, Sep1, Sep 8	Chap 1 PRML	Overview of ML Software Frameworks	SNS	
Week 3: Sept 13-15	Chap 2 PRML	Linear Algebra Probability Theory	SNS	No Class (Labor Day)
Week 4: Sept 20-22	Chap 3 PRML	Linear Regression Gradient Descent	SNS	
Week 5: Sept 27-29	Chap 4 PRML	Linear Classification Logistic Regression	SNS	
Week 6: Oct 4-6	Chap 5 PRML	Neural Networks Network Training	SNS	Project 1 Due
Week 7: Oct11-Oct13	Chap 5 PRML	Deep Learning: Regularization CNNs	SNS	
Week 8: Oct 18-20	Chap 6 PRML Chap 7 PRML	Kernel Methods SVM	SNS	
Week 9: Oct 25-27	Chap 8 PRML	Graphical Models	SNS	Project 2 Due
Week 10: Nov 1-3	Chapter 9 PRML	Unsupervised Learning	SNS	
Week 11: Nov 8-10	Chap 11 PRML	Sampling Methods	SNS	
Week 12: Nov 15-17	Chap 13 PRML	Sequential Models	SNS	
Week 13: Nov 22	Chap 13 Mitchell	Reinforcement Learning	SNS	Project 3 Due
Wk 14: Nov 29-Dec 1		Reinforcement Learning	SNS	
Week 15: Dec 6-8		Neurosymbolic AI	SNS	
			SNS	Project 4 Due
Fri Dec 17	Final Exam			