SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Introduction to Machine Learning

CS 171

Summer 2026 Section 01 In Person 3 Unit(s) 06/01/2026 to 08/07/2026 Modified 05/24/2026

Contact Information

Instructor: Dr. Amith Kamath Belman

Email: amith.kamathbelman@sjsu.edu
Office: MH 411

Office Hours: Thu, 1:30 PM to 3:30 PM , on Zoom: https://sjsu.zoom.us/j/86464231325

Course Information

Instructor: Dr. Amith Kamath Belman

Tuesday, Thursday, 9:00 AM to 11:00 AM, MH 422

Course Description and Requisites

Covers a selection of classic machine learning techniques including backpropagation and several currently popular neural networking and deep learning architectures. Hands-on lab exercises are a significant part of the course. A major project is required.

Prerequisite(s): CS 146 (with a grade of "C-" or better). Computer Science or Software Engineering majors only.

Letter Graded

Classroom Protocols

Regular attendance is an integral part of the learning process. Please arrive to class on time and make sure your cell phones are silent during the lecture.

Class time will be spent in interactive lecture. You are required to bring your wireless laptop to class. Your laptop must remain closed except for designated activities.

In this educational environment, we uphold a strict policy of integrity and respect. Cheating is absolutely unacceptable and will not be tolerated under any circumstances. It is expected by every student to be respectful towards both the instructor and their fellow students, fostering an atmosphere of mutual understanding and cooperation. Lastly, for security and identification purposes, students are required to carry a valid picture ID at all times.

Recording and Privacy

Students are prohibited from recording class activities, distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor

Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Course Learning Outcomes (CLOs)

The focus of this course will be machine learning, with examples from various domains of applications.

After completing this course students will be able to:

(CLO1) Understand, explain, and implement a variety of machine learning techniques

(CLO2) Apply the appropriate models to specific tasks and application domains

(CLO3) Analyze results, assess model performance, and mitigate issues

(CLO4) Present the results using common ML performance indicators and charts

Course Materials

Other Readings:

Machine Learning: An Algorithmic Perspective, Second Edition, 2014, Chapman and Hall/CRCAuthors: Stephen MarslandISBN-13 : 978-1-4665-8333-7 (eBook - PDF)

Machine Learning with Applications in Information Security, by Mark Stamp, published by ChapmanHall/CRC in 2017.ISBN-10 : 1138626783, ISBN-13 : 978-1138626782

Deep Learning (Adaptive Computation and Machine Learning series)Authors: Ian Goodfellow, Yoshua Bengio, Aaron CourvilleISBN-13: 9780262035613, ISBN-10: 0262035618

Software

Python 3

PyCharm Professional or Community Edition - recommended IDE

Course Requirements and Assignments

Homework

Homework assignments will be posted and submitted on Canvas. For full credit, they must be submitted by the posted due date and time.

You may not share or copy code or answers from fellow students or from the web. Infractions will be detected and will lead to an automatic 0. All students involved in academic integrity violations will be held responsible.

Use of AI is not permitted, unless clearly stated and permitted by the instructor, for each assignment question. If a question requires AI assistant usage in any capacity, the instructor will specify it. All other cases of usage will be considered academic integrity violations.

Questions of the Week (QOW)

We will have a single question every week to check your understanding of the previous week's material. I will count the 8 best scores out of the 9 total QOWs in the semester. You must be in the classroom and must use the LockDown browser to access and answer the question on Canvas.

Missed QOWs cannot be made up.

Class Participation

You are expected to attend all class meetings as you are responsible for all the material discussed.

Midterm Exam

The midterm exam will take place in the classroom during class time on July 2nd.

Final Exam

The final exam is scheduled during class time on August 6th.

Grading Information

The final grade in the course will be calculated based on the homework assignments, questions of the week, midterm and final exam.

Makeup exams, QOWs will only be given in cases of illness (documented by a physician) or in documentable, extreme emergency cases.

No other extra credit options will be given.

Late Work

No submissions will be accepted more than 1 day late.

Late assignments will be evaluated with a 25% penalty. Late days include weekend days.

For example, Assignment due on Tuesday by 5 PM:

- will incur a penalty of 25% if submitted anytime between 5:01 PM on Tuesday to 5:00PM on Wednesday.
- will not be graded if submitted after 5:01PM on Wednesday.

Everyone gets two free 'late days' for the semester, separately. Cannot be used on the same assignment. Any assignment submitted after 1 day late is not graded. The two free late days, are only used to refund the 25% penalty that was applied to a late submission, not to extend the deadline or the late day.

Academic Dishonesty

Students who are suspected of cheating will be referred to the Student Conduct and Ethical Development office and depending on the severity of the conduct, will receive a zero on the assignment or a grade of F in the course. Grade Forgiveness does not apply to courses for which the original grade was the result of a finding of academic dishonesty.

Criteria

Type	Weight	Topic	Notes
Homework Assignments	25%		
Questions of the week	15%		
Midterm Exam	20%		
Final Exam	20%		
Project	20%		

Breakdown

Grade	Range	Notes

Grade	Range	Notes
A +	98 to 100%	
A	93 to 97.99%	
A -	90 to 92.99%	
B +	87 to 89.99%	
B	83 to 86.99%	
B -	80 to 82.99%	
C +	77 to 79.99%	
C	73 to 76.99%	
C -	70 to 72.99%	
D	60 to 69.99%	
F	below 60%	

University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Tentative Course Schedule.

NOTE: The course schedule is subject to change with fair notice. Changes will be announced on Canvas.

Week	Dates	Topics	Exams, QOW, Assignments

Week 1	Jun 2, 4	Course logistics, what is ML, the ML workflow, supervised vs unsupervised vs reinforcement, the train, validation, test split, data preprocessing, first model: k-nearest-neighbors	**Jun 2:** Pre-course Survey, Take-home syllabus quiz. **Jun 4:** HW1 (Due Jun 11)
Week 2	Jun 9, 11	Linear and logistic regression, loss functions, gradient descent, overfitting, the bias-variance tradeoff, regularization, cross-validation	**Jun 9:** QOW 1 **Jun 11:** HW2 (Due Jun 18)
Week 3	Jun 16, 18	Evaluation done right: confusion matrix, precision, recall, F1, ROC and AUC, threshold choice; imbalanced data, over- and under-sampling, SMOTE	**Jun 16:** QOW 2 HW3 (Due Jun 22)
Week 4	Jun 23, 25	Decision trees, ensembles, random forests; support vector machines and kernels; feature engineering	**Jun 23:** QOW 3 HW4 (Due Jun 29)
Week 5	Jun 30, Jul 2	Neural networks: perceptron, the multilayer perceptron, back propagation; midterm exam Jul 2	**Jun 30:** QOW 4 **July 2nd: Midterm**
Week 6	Jul 7, 9	Deep learning: activations, initialization, optimization, dropout, batch normalization, training at scale on GPUs	**Jul 7:** QOW 5 HW5 (Due Jul 14)
Week 7	Jul 14, 16	Convolutional neural networks and computer vision; transfer learning; synthetic data and domain randomization	**Jul 14:** QOW 6 HW 6 (Due Jul 21)
Week 8	Jul 21, 23	Natural language processing I: word embeddings, recurrent networks, long short-term memory	**Jul 21:** QOW 7 HW7 (Due Jul 28)
Week 9	Jul 28, 30	Natural language processing II: attention and transformers, large language models and foundation models, fine-tuning, reinforcement learning and RLHF	**Jul 28:** QOW 8

Week 10	Aug 4, 6	Unsupervised learning and clustering, Project report + code repository submission, Final Exam	Aug 4: QOW 9 Aug 6: Final Exam