San José State University
Department of Computer Science
CS171, Introduction to Machine Learning, Section 1, Spring, 2023

Course and Contact Information

Instructor:	Fabio Di Troia
Office Location:	MH 217
Telephone:	
Email:	fabio.ditroia@sjsu.edu
Office Hours:	TT, 1:00 – 2:00pm (https://sjsu.zoom.us/j/82511129916 - PW: 720890)
Class Days/Time:	TT 10.30am – 11:15am
Classroom:	MH 225
Prerequisites:	CS 146 (with a grade of "C-" or better)

Course Format

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on Canvas Leaning Management System course login website at http://sjsu.instructure.com. You are responsible for regularly checking with the messaging system through MySJSU at http://my.sjsu.edu (or other communication system as indicated by the instructor) to learn of any updates.

Course Description

Topics in machine learning. The following machine learning techniques and related topics are covered in detail: hidden Markov models (HMM), profile hidden Markov models (PHMM), principal component analysis (PCA), support vector machines (SVM), clustering, data analysis, backpropagation and selected topics in neural networks. Illustrative applications of each of these major topics are provided, with most of the applications drawn from the field of information security. In addition, the course will include an overview of TensorFlow 2 and its applications, with additional topics as time permits.

Course Learning Outcomes (CLO)

The focus of this course will be machine learning, with illustrative applications drawn primarily from the field of information security. After completing this course students should have a working knowledge of a wide variety of machine learning topics and have a good understanding of how to apply such techniques to real-world problems.

Required Texts/Readings

Textbook

Machine Learning with Applications in Information Security, by Mark Stamp, published by Chapman Hall/CRC in 2017.

ISBN-10 : 1138626783
ISBN-13 : 978-1138626782

Other Readings

None

Other technology requirements / equipment / material

None

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

Homework, Midterm and Final exam are expected for this class. Homework is due on Canvas by class starting time on the due date. Each assigned problem requires a solution and an explanation (or work) detailing how you arrived at your solution. Cite any outside sources used to solve a problem. When grading an assignment, I may ask for additional information.

NOTE that University policy F69-24 at http://www.sjsu.edu/senate/docs/F69-24.pdf states that "Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading."

CoS COVID-19 Safety

All students registered for a College of Science (CoS) class with an in-person component must view the CoS COVID-19 Training slides and the SJSU Phased Adapt Plan website and acknowledge reading them according to their instructor's directions. By working together to follow these county and SJSU safety practices, we can keep our college safer. Students who do not follow COVID-19 Safety practice(s) outlined in the training, the SJSU Phased Adapt Plan, or instructions from their instructors, TAs or CoS Safety Staff may be dismissed from CoS buildings, facilities or field sites. Please review this training as needed throughout the semester, as updates will be implemented as changes occur (and posted to the same links).

Recording Zoom Classes
This course or portions of this course (i.e., lectures, discussions, student presentations) will be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas. The recordings will be deleted at the end of the semester. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording). Students are not allowed to record without instructor permission. Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), 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.

Students are required to have an electronic device (laptop, desktop or tablet) with a camera and built-in microphone. SJSU has a free equipment loan program available for students.
Students are responsible for ensuring that they have access to reliable Wi-Fi during tests. If students are unable to have reliable Wi-Fi, they must inform the instructor, as soon as possible or at the latest one week before the test date to determine an alternative. See Learn Anywhere website for current Wi-Fi options on campus.

Final Examination or Evaluation

The final test will be published on Canvas and will be submitted online.

Grading Information

- Homework, 25%
- Midterm 1, 25%
- Midterm 2, 25%
- Final Project, 25%

Note that "All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades." See University Policy F13-1 at http://www.sjsu.edu/senate/docs/F13-1.pdf for more details.

Determination of Grades

Semester grade will be computed as a weighted average of the scores obtained in each of the three categories listed above.
No make-up tests or quizzes will be given, and no late homework (or other work) will be accepted. Also, in-class work must be completed in the section that you are enrolled in.

Nominal Grading Scale:

Percentage	Grade
92 and above	A
90 – 91	A-
88 – 89	B+
82 – 87	B

80 – 81	B-
78 – 79	C+
72 – 77	C
70 – 71	C-
68 – 69	D+
62 – 67	D
60 - 61	D-
59 and below	F

Classroom Protocol

- **Cheating** will not be tolerated.
- Student must be respectful of the instructor and other students. For example, No disruptive or annoying talking.
- Turn off cell phones
- Class begins on time
- Valid picture ID required at all times

University Policies (Required)

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/". Make sure to review these policies and resources.

CS171 / Introduction to Machine Learning, Spring 2023, Course Schedule

The schedule is subject to change with fair notice communicated via Canvas course page

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	01/26	Introduction to the first part
2	01/31	Artificial Neural Networks
2	02/3	Artificial Neural Networks
3	02/7	Artificial Neural Networks
3	02/9	Deep Learning
4	02/14	Deep Learning
4	02/16	Deep Learning
5	02/21	Deep Learning
5	02/23	Convolutional Neural Networks
6	02/28	**Midterm 1**
6	03/2	Introduction to the second part
7	03/7	Hidden Markov Models
7	03/9	Hidden Markov Models
8	03/14	Hidden Markov Models
8	03/16	Hidden Markov Models
9	03/21	Hidden Markov Models
9	03/23	NLP: Classic vs Machine Learning
10	03/28	SPRING BREAK
10	03/30	SPRING BREAK
11	04/4	NLP: Recurrent Neural Networks
11	04/6	NLP: Long Short Term Memory
12	04/11	NLP: Transformers
12	04/13	Research oriented project
13	04/18	**Midterm 2**
13	04/20	Introduction to the third part
14	04/25	Support Vector Machines
14	04/27	Support Vector Machines
15	05/2	Ensemble Learning

Week	Date	Topics, Readings, Assignments, Deadlines
15	05/4	k-Nearest Neighbors / Random Forest
16	05/9	Clustering
16	05/11	Clustering
17	05/16	Recap
Final Exam	05/23	9:45 AM-12:00 PM