San José State University
Department of Computer Science
CS 256, Topics in Artificial Intelligence, Section 001, Spring, 2019

Course and Contact Information

Instructor:	Gayathri Namasivayam
Office Location:	DH 282
Telephone:	Use email to contact
Email:	Gayathri.Namasivayam@sjsu.edu
Office Hours:	Thursdays, 1.15pm-2pm
Class Days/Time:	Tuesdays and Thursdays, 12pm-1.15pm
Classroom:	MH 422
Prerequisites:	CS 156 or instructor consent

Course Format

Technology Intensive, Hybrid, and Online Courses

This course requires that students have a laptop brought to the class with the latest version of Python 3 installed. Students will also have to install various libraries through the course.

Course Description

Introduction to topics in artificial intelligence such as problem solving methods, game playing, understanding natural languages, pattern recognition, computer vision and the general problem of representing knowledge. Students will be expected to use Lisp. Prerequisite: CS 156 or instructor consent.

Note: In this course we will be using Python not Lisp. We will be introducing and delving into topics in the data mining and machine learning domains including decision trees, ensemble learning, linear regression, logistic regression, neural networks, Naïve Bayes, dimensionality reduction, feature selection, clustering, and anomaly detection.

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to demonstrate knowledge of data mining and machine learning concepts covered in the course, apply the knowledge to identify problems that can be solved using the concepts learned and develop solutions for the problems. The students will gain knowledge of data analysis, transformation and visualization techniques. They will also learn to apply machine learning and data mining algorithms to build models and to evaluate the built models for the datasets domains being used in the course and transfer this knowledge to newer domains.

Required Texts/Readings

Textbook

An Introduction to Statistical Learning, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, ISBN: 9781461471370
(Free download of the book available at the authors link for the book: http://www-bcf.usc.edu/~gareth/ISL/index.html)

Introduction to Data Mining by Pang-Ning Tan, Michael Steinbach, and Vipin Kumar, ISBN: 9780321321367
(Free download of chapters on Decision Trees, Clustering and Association Analysis at the authors link for the book: https://www-users.cs.umn.edu/~kumar001/dmbook/index.php)

The Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani and Jerome Friedman. ISBN: 9780387848570
(Free download of the book available at the authors link for the book at: https://web.stanford.edu/~hastie/ElemStatLearn/)

Machine Learning, Tom Mitchell, ISBN: 0070428077 9780070428072

Other technology requirements / equipment / material

Students are expected to have in class a laptop with Python 3 and relevant libraries for data analysis and machine learning installed.

Course Requirements and Assignments

In this class, there will be weekly in-class assignments, 3-4 homework assignments, midterm, final exam and a final project. The in-class assignment might be a quiz and/or a programming activity that must be completed and submitted. The in-class assignment is to help students further understand a particular concept that was discussed in-class and a segment of it might be evaluated during the class. Instructor will also provide opportunities for students to present their in-class assignments during class. The students might be given topics to read or review through the semester and in-class assignments can also be based of them. The homework assignments will have a programming part and a written part. The final project will be a programming project and must be presented in class. In addition, a written description of the project must be submitted by the deadline. The guidelines for a written description of the project will be provided in class. The midterm and final are written exams. All assignments are due on the date and time indicated on it. Each student is allowed to submit a maximum of one homework assignment that is 24 hours past the deadline and can still receive 75% of the grade on it.

The final project proposal must be provided by the week of March 1st. A written abstract of the final project and a reference to the data being used must be provided the week of March 15th. Students must have the data in an accessible form by March 15th. A written update of the project is due on April 11th. The final report is due by May 1st and a final presentation must be done in-class on the date assigned. The project can be done individually or in groups of two. Students are encouraged to work on data that can be obtained from Kaggle (https://www.kaggle.com/).

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction,

preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus."

Final Examination or Evaluation

The final exam will be a closed book exam and will take place on the date assigned by the University. Please, see the date and time provided in the schedule below.

Grading Information

Grading:
In-class assignments 10%
Homework assignments 30%
Midterm exam 20%
Final exam 20%
Final project 20%

Determination of Grades

97–100	A+
92–96	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

Students are expected to actively participate in class by asking questions and presenting their work and solutions. Students are not allowed to talk using their phones while in class. Laptops must be used in-class only for class related activities during times assigned by the instructor. Students are allowed to discuss their assignments, however, it is mandatory to acknowledge the persons with whom the assignment was discussed with. Students are expected to submit individual work and cannot share their assignments. Cheating is strictly not allowed in this course. Any work taken from any source must be acknowledged in the assignments.

University Policies

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/"

CS 256 / Topics in Artificial Intelligence, Spring 2019, Course Schedule

Here is the tentative agenda for the course. It is possible that some of the topics planned to be covered in a particular week could extend into the following week.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	Jan 24nd	First day of class, syllabus
2	Jan 29th	Motivation for machine learning, data mining Decision Trees
3	Feb 5th	Bias-Variance Tradeoff Introduction to probability theory
4	Feb 12th	Bayes Rule, Maximum Likelihood Estimator, Naïve Bayes, Logistic Regression
5	Feb 19th	Linear and Non-Linear Regression
6	Feb 26th	Ensemble methods
7	March 5th	Data analysis and Data visualization Feature selection, Feature transformation
8	March 12th	Neural Networks-Part I
9	March 19th	Review, Midterm
10	March 26th	Neural networks -Part II
11	April 2nd	Spring Recess
12	April 9th	Dimensionality reduction
13	April 16th	Clustering
14	April 23rd	Anomaly Detection
14	April 30th	SVM's and Review for Final
16	May 7th	Final project presentation
Final Exam	May 20th	Final Exam (9.45am-12pm)