

San José State University
School/Department
CS 256, Topics in Artificial Intelligence, Section 002, Spring, 2018

Course and Contact Information

Instructor:	Gayathri Namasivayam
Office Location:	DH 282
Telephone:	Use email to contact
Email:	Gayathri.Namasivayam@sjsu.edu
Office Hours:	Thursday 1.45pm-3pm and by appointment
Class Days/Time:	Tuesday and Thursday, 3.00pm-4.15pm
Classroom:	DH 450
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, 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, 4-5 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 online. The students might be given topics to read or review through the semester and in-class assignments can also be based of them. Quizzes will be given every Tuesdays and other activities such as in-class programming will be given on Thursdays. 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 20th. A written update of the final project must be provided the week of April 17th. A final report of the project is due on May 6th and a final presentation must be done in-class on the date assigned the week of May 8th. The project can be done individually or in groups of two.

Final Examination or Evaluation

The final exam will be a closed book exam and will take place on Friday May 18th at 2.45pm at DH 450.

Grading Information

Grading:

In-class assignments 5% (50% of the assignment will be graded for 5% of the final grade and the remaining 50% if submitted will be graded for an extra credit of 5%)

Homework assignments 45%

Midterm exam 15%

Final exam 15%

Final project 20%

Determination of Grades

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

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. Students are allowed to discuss and collaborate on their assignments, however, it is mandatory to acknowledge the persons with whom the assignment was discussed with. 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](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

CS 256 / Topics in Artificial Intelligence, Spring 2018, Course Schedule

Here is the tentative agenda for the course. If there is any change, students will be notified in advance.

Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	Jan 25 th	First day of class, syllabus and motivation for machine learning, data mining
2	Jan 30 th	Classification – Decision Trees Bias-Variance Tradeoff
3	Feb 6 th	Ensemble methods
4	Feb 13 th	Regression -Linear, non-linear
5	Feb 20 th	Bayes Rule, Maximum likelihood estimator, Classification- Naïve Bayes, Logistic Regression
6	Feb 27 th	Neural networks -Part I
7	March 6 th	Neural networks -Part II
8	March 13 th	Data analysis and Data visualization Feature selection, Feature transformation, Dimensionality reduction
9	March 20 th	Review, Midterm
10	March 27 th	Spring Recess
11	April 3 rd	Clustering
12	April 10 th	Anomaly Detection
13	April 17 th	Association Rules
14	April 24 th	TBD (Graphical Models/NLP/Reinforcement Learning/Recommender Systems)
15	May 1 st	TBD
16	May 8 th	Review/Final project presentation
Final Exam	May 18 th	DH 450 at 2.45pm