

De Anza College  
**Course Outline of Record Report**  
 10/02/2025

## CISD017A : Introduction to Machine Learning

### General Information

Faculty Initiator:	<ul style="list-style-type: none"> <li>Clare Nguyen</li> <li>Pape, Mary</li> </ul>
Attachments:	UCTransferable_CIS_17A_2026F.pdf Hybrid_CIS_17A_2026F.pdf Online_CIS_17A_2026F.pdf ReqAdv_G_CIS_17A_2026F_1.pdf ReqAdv_G_CIS_17A_2026F_2.pdf
Course ID (CB01A and CB01B) :	CISD017A
Short Course Title:	INTRO TO MACHINE LEARNING
Course Title (CB02) :	Introduction to Machine Learning
Department:	CIS - Computer Sci and Info Systems
Effective Term:	Fall 2026
TOP Code (CB03) :	(0799.00) *Other Information Technology
CIP Code:	(11.9999) Computer and Information Sciences and Support Services, Other.
SAM Priority Code (CB09) :	C - Clearly Occupational
Distance Education Approved:	Yes
Course Control Number:	No value
Curriculum Committee Approval Date:	06/17/2025
Board of Trustees Approval Date:	Pending
External Review Approval Date:	09/01/2026
Course Description:	This course introduces the core principles, algorithms, and applications of machine learning. Through hands-on projects in supervised and unsupervised learning, students apply machine learning models to analyze real-world data and then evaluate and improve the accuracy of these models. Students will gain experience with the data preparation workflow, statistical learning, and model selection.
Course Type (CB27) :	<ul style="list-style-type: none"> <li>Lower Division</li> </ul>
Mode of Delivery:	<ul style="list-style-type: none"> <li>Online</li> <li>Hybrid</li> </ul>
Faculty Initiator:	No value
Course Family:	Not Applicable

### Faculty Requirements

Discipline 1:	<ul style="list-style-type: none"> <li>Computer Science</li> </ul>
Discipline 2:	No value

Discipline 3:

No value

FSA:

- FHDA FSA - COMPUTER SCIENCE

### Formerly Statement

Formerly Statement

No Value

### Course Justification

Course Justification

This is a UC/CSU transferable course. It is CTE and belongs in the Certificate of Achievement - Advanced in Applied Artificial Intelligence. This course will provide students with introductory core knowledge and hands-on experience in applying machine learning models in a variety of applications.

### Stand-Alone Statement

Stand-Alone Statement

No Value

### Course Philosophy

Course Philosophy

No Value

### CTE Course

Is this a CTE (Career Technical Education) course?

Yes

### Honors/Non-honors Course

Is this an honors/non-honors course?

No

**Mirrored Credit/Noncredit Course**

**Is this a mirrored credit/noncredit course?**

No

**Cross-listed Course**

**Is this a cross-listed course?**

No

**Foothill Equivalency**

**Does the course have a Foothill equivalent?**

No

**Foothill Faculty Consultation Name**

No Value

**Foothill Course ID**

No Value

**Course Development Options**

**Basic Skill Status (CB08)**

Course is not a basic skills course.

**Course Special Class Status (CB13)**

Course is not a special class.

**Grade Options**

- Letter Grade
- Pass/No Pass

**Repeat Limit**

0

**Course Prior To College Level**

Not applicable.

**Repeatability Statement**

No value

**Course Support Status (CB26)**

Course is not a support course

**Associated Programs**

Course is part of a program

**Associated Program**

**Award Type**

**Active**

Applied Artificial Intelligence Associate of Science (In Development)

Associate in Science (A.S.) Degree

Fall 2026

Applied Artificial Intelligence Certificate of Achievement - Advanced (In Development)

Certificate of Achievement-Advanced (COA-A)

Fall 2026

### Transferability & Gen. Ed. Options

Course General Education Status (CB25)

Y

Transferability (CB05)

Transferable to both UC and CSU

Transferability Status

Pending

### UC Transferable and/or Lower-Division Major Requirement

Will the course be UC transferable?

Yes

If yes, identify the lower-division UC course and campus.

UC Santa Cruz CSE 40: Machine Learning Basics: Data Analysis and Empirical Methods

Will the course fulfill a UC/CSU lower-division major requirement?

No

If yes, identify the UC/CSU campus, course and major.

No Value

### Units and Hours

#### Summary

<b>Minimum Credit Units</b>	4.5
<b>Maximum Credit Units</b>	4.5
<b>Total Course In-Class (Contact) Hours</b>	66
<b>Total Course Out-of-Class Hours</b>	96
<b>Total Student Learning Hours</b>	162

#### Credit / Non-Credit Options

**Course Credit Status (CB04)**

Credit - Degree Applicable

**Course Non Credit Category (CB22)**

Credit Course.

**Course Classification Code (CB11)**

Credit Course.

Variable Credit Course

**Funding Agency Category (CB23)**

Not Applicable.

Cooperative Work Experience Education Status (CB10)

**Weekly Student Hours**

	In Class	Out of Class
Lecture Hours	4	8
Laboratory Hours	1.5	0
NA Hours	0	0

**Course Student Hours**

<b>Course Duration (Weeks)</b>	12
<b>Hours per unit divisor</b>	36
<b>Course In-Class (Contact) Hours</b>	
Lecture	48
Laboratory	18
NA	0
<b>Total</b>	66
<b>Course Out-of-Class Hours</b>	
Lecture	96
Laboratory	0
NA	0
<b>Total</b>	96

**Units and Hours - Weekly Specialty Hours**

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

**SKIP**

No Value

**Specifications**

**Methods of Instruction**

Methods of Instruction

Methods of Instruction

Methods of Instruction

- Collaborative learning and small group exercises
- Collaborative projects
- Discussion and problem-solving performed in class
- Discussion of assigned reading
- Homework and extended projects

In-class exploration of internet sites  
 Laboratory discussion sessions and quizzes that evaluate the proceedings weekly laboratory exercises  
 Lecture and visual aids  
 Quiz and examination review performed in class

**Assignments**

- A. Reading in textbook, online references, and lecture notes.
- B. 6-8 problem solving assignments on evaluating and applying machine learning models.

**Methods of Evaluation**

Methods of Evaluation

**Methods of Evaluation**

- A. Assignments and quizzes are evaluated for completeness, correctness, and proper application and evaluation of machine learning models.
- B. In-class problem solving and group collaborative problem solving are evaluated for the ability to apply machine learning models appropriately and interpret the results correctly.
- C. One or more examinations with questions on machine learning concepts and applications discussed in class, which require the student to apply machine learning models appropriately or write short answers. Submitted work will be graded on correctness and completeness.
- D. A comprehensive final examination with questions on machine learning concepts and applications discussed in class, which require the student to apply machine learning models appropriately or write short answers. Submitted work will be graded on correctness and completeness.

**Essential Student Materials/Essential College Facilities**

**Essential Student Material:**

- None

**Essential College Facilities:**

- None

**Examples of Primary Texts and References**

Author	Title	Publisher	Date/Edition	ISBN
Jake VanderPlas	Python Data Science Handbook	O'Reilly Media	January 2023, 2nd Edition	978-1098121228

**Suggested Reading List**

No Value

## Learning Outcomes

### Course Objectives

Investigate Machine Learning Pipeline and Toolkits

Evaluate Machine Learning Concepts

Perform Data Preprocessing and Data Wrangling

Apply Supervised Learning

Apply Unsupervised Learning

Investigate Ethics in Machine Learning

### CSLOs

Explain machine learning concepts and implementation.

Expected SLO Performance: 0.0

Identify machine learning problems, apply and evaluate machine learning algorithms to solve the problems.

Expected SLO Performance: 0.0

## Outline

### Course Outline

- A. Investigate Machine Learning Pipeline and Toolkits
  - 1. Overview of the data pipeline
  - 2. Data collection
  - 3. Python machine learning toolkits
- B. Evaluate Machine Learning Concepts
  - 1. Inductive reasoning
  - 2. Model fitting
  - 3. Training and testing data
  - 4. Overfitting and underfitting
- C. Perform Data Preprocessing and Data Wrangling
  - 1. Missing data, outliers, data cleaning
  - 2. Data encoding, feature scaling
  - 3. Imbalance data
  - 4. Feature selection
  - 5. Exploratory data analysis
  - 6. Data visualization
- D. Apply Supervised Learning
  - 1. Regression models
  - 2. Classification models

- 3. Evaluation metrics, tune models
- E. Apply Unsupervised Learning
  - 1. Clustering
  - 2. Principal Component Analysis
  - 3. Evaluation metrics, tune models
- F. Investigate Ethics in Machine Learning
  - 1. Data bias and fairness
  - 2. Responsible machine learning practices

**Lab Outline**

- A. Use the Python machine learning toolkits to retrieve and read data from multiple types of data sources.
- B. Process data, handle missing values, encode categorical data, and scale features.
- C. Perform feature selection, data visualization, and exploratory data analysis to prepare for machine learning.
- D. Select appropriate supervised learning regression models, train and test the models, and evaluate their accuracy.
- E. Select appropriate supervised learning classification models, train and test the models, and evaluate their accuracy.
- F. Select appropriate unsupervised learning models, train and test the models, and evaluate the outcome.
- G. Detect data bias, identify disparities in data, check for model bias.

**Blue Form**

For changes to the units and hours tab; 1) Contact the Curriculum Office at curriculum@fhda.edu with the course information changes; and 2) address items 1-3 below. Please be aware that load factors and seat counts are assigned based on established, negotiated values.

No Value

1. Is the unit(s) change required for articulation?

No Value

2. If the course is UC or CSU transferable, identify one UC or CSU campus with the same unit value requested and copy and paste the catalog description of the course.

No Value

3. Identify the areas in the course outline of record that justify the unit(s) and/or hour(s) change.

No Value

Office Use ONLY: For a REVISION, state the existing unit(s); lec hour(s) and load; lab hour(s) and load; and seat count.

No Value

Office Use ONLY: For a REVISION, state the new unit(s); lec hour(s) and load; lab hour(s) and load; and seat count.

No Value

Office Use ONLY: For NEW, state the unit(s); lec hour(s) and load; lab hour(s) and load; and seat count.

- Units: 4.5
- Lec Hrs: 4
- Lec Load: .089

- Lab Hrs: 1.5
- Lab Load: .024
- Total Load: .113
- Seat Ct: 40
- (mkct 5/22/25)

**Req/Adv****Prerequisite(s):**

(CIS D007. and STAT C1000 (or STAT C1000H)) or CIS D011.

**Corequisite(s):**

No Value

**Advisory(ies):**

No Value

**Advisory(ies) - Other:**

CIS D040.

**Limitation(s) on Enrollment:**

No Value

**Limitation(s) on Enrollment - Other:**

No Value

**Entrance Skills(s):**

No Value

**Entrance Skill(s) - Other:**

No Value

**General Course Statement(s):**

No Value

**General Course Statement(s) - Other:**

No Value

**A-Matrix Form**

EWRT D001A or EWRT D01AH or ESL D005. If this is the requisite for the course, complete the objective(s) below. If this requisite is being removed, provide an explanation as to why.

No Value

**Objective 1: Analyze college level texts and discourse that are culturally and rhetorically diverse.**

No Value

**Objective 2: Compose essays drawn from personal experience and assigned texts.**

No Value

**Objective 3: Utilize MLA guidelines to format essays, cite sources, and compile a works cited page.**

No Value

**Objective 4: Create syntactically varied sentences that are free of mechanical errors.**

No Value

**Objective 5: Distinguish, compare, and evaluate the multiplicity and ambiguity of perspectives.**

No Value

**B-Matrix Form**

ESL D272. and ESL D273., or ESL D472. and ESL D473., or eligibility for EWRT D001A or EWRT D01AH or ESL D005. If this is the requisite for the course, complete the objective(s) below. If this requisite is being removed, provide an explanation as to why.

No Value

**Objective 1: Analyze a variety of college-level texts with a focus predominantly on expository and argumentative writing.**

No Value

**Objective 2: Develop analytical ideas and topics for essays.**

No Value

**Objective 3: Compose and support thesis statements for analytical essays.**

No Value

**Objective 4: Develop clear sequential relationship between central argument/controlling idea and supporting ideas in writing.**

No Value

**Objective 5: Identify and practice writing for different audiences and purposes.**

No Value

**Objective 6: Develop and demonstrate a variety of rhetorical strategies to develop strong analysis in essays.**

No Value

**Objective 7: Demonstrate writing as a multi-step process including attention to planning and revision.**

No Value

**Objective 8: Practice composing organized, developed, analytical essays that increase in complexity.**

No Value

**Objective 9: Demonstrate appropriate grammar usage and mechanics.**

No Value

### **C-Matrix Form**

ESL D261. and ESL D265., or ESL D461. and ESL D465., or eligibility for EWRT D001A or EWRT D01AH or ESL D005. If this is the requisite for the course, complete the objective(s) below. If this requisite is being removed, provide an explanation as to why.

No Value

**Objective 1: Create compositions about fiction and non-fiction texts from many cultural and social perspectives in a variety of genres.**

No Value

**Objective 2: Compose a focused, purposeful, developed paper of 500 words or more that engages with, responds to, or is inspired by written or visual texts.**

No Value

**Objective 3: Produce written work using a cyclical process of multiples drafts and revisions.**

No Value

**Objective 4: Demonstrate the ability to include a variety of sentence structures in writing.**

No Value

**Objective 5: Edit compositions to correct errors in the major conventions of Standard Written English.**

No Value

### **D-Matrix Form**

Intermediate algebra or equivalent (or higher), or appropriate placement beyond intermediate algebra. If this is the requisite for the course, complete the objective(s) below. If this requisite is being removed, provide an explanation as to why.

No Value

**Objective 1: Plan, implement, and assess work cycles, at the problem, lesson, module, and course level, to develop self-efficacy through the practice of self-regulated learning.**

No Value

**Objective 2: Investigate the use of mathematics in real world.**

No Value

**Objective 3: Explore functions.**

No Value

**Objective 4: Develop linear function models.**

No Value

**Objective 5: Use systems of two linear equations to solve real world problems.**

No Value

**Objective 6: Use linear inequalities in one variable to solve real world problems.**

No Value

**Objective 7: Examine exponential expressions and develop exponential function models.**

No Value

**Objective 8: Examine logarithmic expressions and develop logarithmic function models.**

No Value

**Objective 9: Develop quadratic function models to solve problems.**

No Value

**Objective 10: Investigate the characteristics of rational expressions.**

No Value

**Objective 11: Develop skills to work with radical expressions.**

No Value

**E-Matrix Form**

Elementary algebra or equivalent (or higher), or appropriate placement beyond elementary algebra. If this is the requisite for the course, complete the objective(s) below. If this requisite is being removed, provide an explanation as to why.

No Value

**Objective 1: Develop, throughout the course as applicable, systematic problem-solving methods.**

No Value

**Objective 2: Explore the function concept algebraically, numerically, verbally and graphically.**

No Value

**Objective 3: Explore the graphical and numerical characteristics of linear relationships and describe their meaning in the context of a problem.**

No Value

**Objective 4: Develop linear function models to solve problems.**

No Value

**Objective 5: Use systems of two linear equations to solve real-world problems.**

No Value

**Objective 6: Explore the graphical and numerical characteristics of quadratic relationships and describe their meaning in the context of a problem.**

No Value

**Objective 7: Develop quadratic function models to solve problems.**

No Value

**Objective 8: Use inequalities to solve real world problems.**

No Value

**Objective 9: Explore arithmetic sequences and series.**

No Value

**Objective 10: Investigate, throughout the course as applicable, how mathematics has developed as a human activity around the world.**

No Value

**F-Matrix Form**

Pre-algebra or equivalent (or higher), or appropriate placement beyond pre-algebra. If this is the requisite for the course, complete the objective(s) below. If this requisite is being removed, provide an explanation as to why.

No Value

**Objective 1: Develop, throughout the course as applicable, systematic problem solving methods.**

No Value

**Objective 2: Solve problems involving arithmetic operations, including fractions, percents and decimals.**

No Value

**Objective 3: Apply the order of operations to evaluate signed numerical expressions.**

No Value

**Objective 4: Solve problems involving operations with signed numbers.**

No Value

**Objective 5: Explore the characteristics and properties of real numbers.**

No Value

**Objective 6: Use estimation to determine approximate solutions and to check the reasonableness of answers.**

No Value

**Objective 7: Explore rates and ratios and use proportions to solve problems.**

No Value

**Objective 8: Explore, as applicable throughout the course, the geometry of mathematical measurements and solve problems involving geometric figures and formulas.**

No Value

**Objective 9: Explore the use of variables in expressions and evaluate algebraic expressions.**

No Value

**Objective 10: Solve linear equations in one variable numerically and algebraically.**

No Value

**Objective 11: Graph linear relationships on a Cartesian coordinate by plotting ordered pairs.**

No Value

**Objective 12:** Investigate, throughout the course as applicable, how mathematics has developed as a human activity around the world.

No Value

### G-Matrix Form

If the requisite does not fall under an A-F Matrix and is being removed, provide an explanation as to why.

No Value

If the requisite does not fall under an A-F Matrix and is being retained/added, download the Content Review Matrix G from the Reference Materials, and follow the remaining instructions on the form. Reminder that: an "OR" conjunction statement requires ONE representative G-Matrix; an "AND" conjunction statement requires a separate G-Matrix for EACH course.

No Value

### H-Matrix Form

**Objective 1:** For entrance into a CTE program such as Nursing, AUTO, APRN, etc... list the prerequisite(s) to participate in the program.

No Value

**Objective 2:** For Student Cohorts, such as Honors, Puente, performance groups, intercollegiate teams, Special Projects course, etc... list the prerequisite(s) to participate in the cohort.

No Value

**Objective 3:** For Prerequisites based on Government/Licensing/Certification Regulations, or legal requirements, cite the regulation that mandates a prerequisite or attach a copy of it to this form.

No Value

**Objective 4:** For Requirements based on Health and Safety, describe the specific skills, concepts, and information without which the students would create a hazard to themselves or those around them. Also describe how students will meet those skills.

No Value

**Objective 5:** For Entrance Skills that are necessary for taking the course, describe the specific skills and the reason they are necessary for this course. Also describe how students will meet those skills.

No Value

**Objective 6:** For other Limitations on Enrollment not covered above, indicate the limitation on enrollment and the reason it is necessary for this course. Also describe how students will be able to meet the requirement.

No Value

**De Anza GE Form**

**Criteria 1: Present core concepts and scope that define the discipline. (ONLY using the Outline, Assignments or Methods of Evaluation areas, cite, copy and paste the area referenced.)**

No Value

**Criteria 2: Foster oral and written communication and collaborative exercises. Note that this criteria has three separate pieces: oral communication, written communication, and collaborative exercises. (ONLY using the Outline, Assignments or Methods of Evaluation areas, cite, copy and paste the area referenced.)**

No Value

**Criteria 3: Stimulate critical thinking. (ONLY using the Outline, Assignments or Methods of Evaluation areas, cite, copy and paste the area referenced.)**

No Value

**Criteria 4: Include diverse perspectives and contributions in the discipline such as: gender, culture, values, and/or societal perspectives. (ONLY using the Outline, Assignments or Methods of Evaluation areas, cite, copy and paste the area referenced.)**

No Value

**Criteria 5: Provide global and historical context. (ONLY using the Outline, Assignments or Methods of Evaluation areas, cite, copy and paste the area referenced.)**

No Value

**Criteria 6: Use real-world or hands-on applications that will provide a context for the concepts being discussed. (ONLY using the Outline, Assignments or Methods of Evaluation areas, cite, copy and paste the area referenced.)**

No Value

**Comments****Stage 2: Department Chair**

No Value

**Stage 3: Division Curriculum Representative**

No Value

**Stage 4: Division Dean**

No Value

**Stage 5: SLO Coordinator**

No Value

<p><b>Stage 7: Content Review Matrix Liaison</b></p> <p>No Value</p>
<p><b>Stage 8: Dean of Online Learning</b></p> <p>No Value</p>
<p><b>Stage 9: Articulation Officer</b></p> <p>No Value</p>
<p><b>Stage 10: De Anza General Education</b></p> <p>No Value</p>
<p><b>Stage 13: Curriculum Committee</b></p> <p>No Value</p>

<p><b>CO</b></p>
<p><b>Sort ID (00 &lt; 10; 0 &lt; 100)</b></p> <p>CIS 017A</p>
<p><b>Course Status</b></p> <p>New</p>
<p><b>Course Characteristics</b></p> <ul style="list-style-type: none"> <li>• CTE</li> </ul>
<p><b>Cross-Listed/Related Course Information</b></p> <ul style="list-style-type: none"> <li>• NA</li> </ul>
<p><b>Cross-Listed/Related Course ID's</b></p> <p>No Value</p>
<p><b>DL Approval Date (MM/DD/YYYY)</b></p> <p>06/17/2025</p>
<p><b>Hybrid Approval Date (MM/DD/YYYY)</b></p> <p>06/17/2025</p>
<p><b>Curriculum Office Notes</b></p>

No Value