Glendale College

Course Outline of Record Report

Course ID 010749

Created - November 2024

CS/IS271 : Machine Learning Fundamentals

General Information

Author:	• Edwin Sookiassian
Course Code (CB01) :	CS/IS271
Course Title (CB02) :	Machine Learning Fundamentals
Department:	CSIS
Proposal Start:	Spring 2026
TOP Code (CB03) :	(0707.10) Computer Programming*
CIP Code:	(11.0201) Computer Programming/Programmer, General.
SAM Code (CB09) :	Possibly Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000653136
Curriculum Committee Approval Date:	11/27/2024
Board of Trustees Approval Date:	04/22/2025
Last Cyclical Review Date:	11/27/2024
Course Description and Course Note:	CSIS 271 provides a comprehensive introduction to the core principles and methodologies of machine learning, with a focus on predictive modeling through logistic and linear regression. Students study the theory and practice of these fundamental algorithms, exploring their underlying assumptions, wide-ranging applications, and potential limitations. Beyond theoretical knowledge, students will gain hands-on experience with the end-to-end process of developing and deploying machine learning models.
Justification:	New Course
Academic Career:	• Credit
Mode of Delivery:	No value
Author:	• Edwin Sookiassian
Course Family:	No value

Academic Senate Discipline

Primary Discipline:	• Computer Science
Alternate Discipline:	No value
Alternate Discipline:	No value

Course Development

Basic Skill Status (CB08)

Course is not a basic skills course.

☐ Allow Students to Gain Credit by Exam/Challenge

Course Special Class Status (CB13)

Course is not a special class.

Pre-Collegiate Level (CB21)

Not applicable.

Grading Basis

- Grade with Pass / No-Pass Option

Course Support Course Status (CB26)

Course is not a support course

General Education and C-ID

General Education Status (CB25)

Not Applicable

Transferability

Transferable to both UC and CSU

Transferability Status

Pending

Units and Hours

Summary

Minimum Credit Units (CB07)	4
Maximum Credit Units (CB06)	4
Total Course In-Class (Contact) Hours	72
Total Course Out-of-Class Hours	144
Total Student Learning Hours	216

Credit / Non-Credit Options

Course Type (CB04)

Credit - Degree Applicable

Noncredit Course Category (CB22)

Credit Course.

Noncredit Special Characteristics

No Value

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	0	0
Studio Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	54
Course In-Class (Contact) Hours	
Lecture	72

Laboratory	0
Studio	0
Total	72

Course Out-of-Class Hours

Lecture	144
Laboratory	0
Studio	0
Total	144

Time Commitment Notes for Students

No value

Units and Hours - Weekly Specialty Hours

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

Prerequisites, Corequisites, Recommended Corequisites, and Recommended Preparation

Prerequisite

STATC1000 - Introduction to Statistics

Objectives

- Identify the standard methods of obtaining data and identify advantages and disadvantages of each.
- Calculate probabilities using normal and t-distributions.
- Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem.
- Construct and interpret confidence intervals.

OR

Prerequisite

STATC1000E - Introduction to Statistics

Objectives

- Identify the standard methods of obtaining data and identify advantages and disadvantages of each.
- Calculate probabilities using normal and t-distributions.
- Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem.
- Construct and interpret confidence intervals.

OR

Prerequisite

STATC1000H - Introduction to Statistics - Honors

Objectives

- Identify the standard methods of obtaining data and identify advantages and disadvantages of each.
- Calculate probabilities using normal and t-distributions.
- Distinguish the difference between sample and population distributions and analyze the role played by the Central Limit Theorem.
- Construct and interpret confidence intervals.

OR

Prerequisite

MATH137 - Statistics for Data Science

Objectives

- Identify the standard methods of obtaining data and identify advantages and disadvantages of each.
- Summarize data graphically and numerically and interpret the results through visualization using Python.
- Calculate measures of central tendency and variation of data sets.
- Formulate hypothesis tests involving samples from one and two populations using Python.
- Use linear regression and Analysis of Variance (ANOVA) for estimation and inference, and interpret the associated statistics.

Outcomes

- Write correct computer code that will produce appropriate visualizations and analysis of data.
- Analyze and describe studies, data sets, and probability models.
- Apply confidence intervals and hypothesis testing to form conclusions about realistic data.

Entry Standards

Entry Standards	Description
No value	No value

Course Limitations

Cross Listed or Equivalent Course	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction	Lecture
Methods of Instruction	Laboratory
Methods of Instruction	Multimedia

Methods of Instruction	Discussion
Methods of Instruction	Guest Speakers

Out of Class Assignments

Programming assignments

- Working with data structures (lists, dictionaries, sets, tuples)
- Implementing functions and classes
- Data manipulation tasks with NumPy and Pandas
- Data transformation techniques
- Importing and exporting data in various formats
- Data visualization using MatPlotLib
- Building and visualizing a simple linear regression model on real-world data
- Building and visualizing a logistic regression model
- Creating a Dockerfile, building and running a container
- Deploying a simple machine learning model using Docker
- Deploying a simple machine learning model to AWS
- Setting up a basic CI/CD pipeline for continuous deployment of a simple machine learning model

Methods of Evaluation	Rationale
Exam/Quiz/Test	Quizzes
Exam/Quiz/Test	Midterm Examination
Exam/Quiz/Test	Final Examination
Project/Portfolio	Programming Projects

Textbook Rationale

Textbook acts as an introduction to Machine Learning techniques and applications using Python

Textbooks

Author	Title	Publisher	Date	ISBN
Mark Fenner	Machine Learning with Python for Everyone	Addison-Wesley Professional	2019	9780134845647

Other Instructional Materials (i.e. OER, handouts)

No Value

Learning Outcomes

Course Objectives

Explain the mathematical foundations and assumptions of linear and logistic regression models.

Design, implement, and evaluate regression models using Python and relevant libraries.

Optimize regression models by performing feature selection and regularization to enhance model performance.

Deploy machine learning models into production using APIs and cloud platforms.

Monitor and adjust deployed models to ensure continued performance and relevance.

SLOs

Construct and refine linear and logistic regression models for diverse applications. Expected Outcome Performance: 70.0

Implement a streamlined deployment pipeline for machine learning models using cloud services and containerization tools from development to production. Expected Outcome Performance: 70.0

Analyze and address ethical considerations and data privacy in model development and deployment. Expected Outcome Performance: 70.0

Additional SLO Information

Does this proposal include revisions that might improve student attainment of course learning outcomes?

No

Is this proposal submitted in response to learning outcomes assessment data?

No

If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.

No Value

SLO Evidence

No Value

Course Content

Lecture Content

Python Foundations (8 hours)

- Core data structures in Python
- Principles of object-oriented programming
- Introduction to Python's NumPy, Pandas, Scikit-learn, and MatPlotLib libraries

Introduction and Mathematical Foundations (8 hours)
- Overview of predictive modeling concepts
- Introduction to linear and logistic regression
- Formulation steps for machine learning models
- Matrix operations, eigenvalues and eigenvectors

Statistical Foundations (6 hours)
- Basics of probability theory
- Comparison of Bayesian and frequentist approaches in inferential statistics
- Essentials of descriptive statistics

Data Preparation (5 hours)
- Differentiating categorical vs continuous variables
- Data formats: CSV, JSON, Excel
- Handling structured vs unstructured data
- Basic database structures and data manipulation

Linear Regression In-Depth (14 hours)
- Distinction between regression and correlation
- Fundamentals of simple regression
- Linear regression theory and model assumptions
- Model performance evaluation
- Diagnosis and resolution of common linear regression issues

Logistic Regression In-Depth (14 hours)
- Logistic regression theory and model assumptions
- Model performance evaluation
- Diagnosis and resolution of common logistic regression issues

Model Deployment Fundamentals (8 hours)
- Overview of the model deployment lifecycle: training to production
- Introduction to Docker and containerization
- Ensuring consistent environments using Docker
- Best practices for Docker container management

Advanced Model Deployment Techniques (6 hours)
- **Strategies for cloud-based model deployment**
- **Automation in model training and deployment using cloud services**
- **CI/CD pipelines: setup and monitoring**

Exposure to Other Machine Learning Techniques (3 hours)
- Introduction to neural networks, deep learning, and tree-based models
- Overview of clustering algorithms

Total Hours: 72

Additional Information

Repeatability

Not Repeatable

Justification (if repeatable was chosen above)

No Value

Is it possible this course will have a material fee?

No Value

I have contacted my library liaison (https://campusguides.glendale.edu/faculty/liaisons):

No Value

What term(s) will this course be offered?

No Value

Will any additional resources be needed for this course? (Click all that apply)

No Value

If additional resources are needed, add a brief description and cost in the box provided.

No Value

Resources

Did you contact your departmental library liaison?

No

If yes, who is your departmental library liason?

No Value

Did you contact the DEIA liaison?

No

Were there any DEIA changes made to this outline?

No

If yes, in what areas were these changes made:

No Value

Will any additional resources be needed for this course? (Click all that apply)

- No

If additional resources are needed, add a brief description and cost in the box provided.

No Value