De Anza College

Course Outline of Record Report

10/02/2025

CISD080. : Introduction to Natural Language Processing

General Information

Faculty Initiator:	• Clare Nguyen • Pape, Mary
Attachments:	ReqAdv_G_CIS_80_2026F_2.pdf Hybrid_CIS_80_2026F.pdf Online_CIS_80_2026F.pdf ReqAdv_G_CIS_80_2026F_1.pdf
Course ID (CB01A and CB01B) :	CISD080.
Short Course Title:	INTRO NATURAL LANG PROCESSING
Course Title (CB02) :	Introduction to Natural Language Processing
Department:	CIS - Computer Sci and Info Systems
Effective Term:	Fall 2026
TOP Code (CB03) :	(0707.10) *Computer Programming
CIP Code:	(11.0201) Computer Programming/Programmer, General.
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 explores the core theory and practice in natural language processing (NLP). Working on tasks such as syntactic parsing, text classification, and sentiment analysis, students gain skills in data preprocessing, feature extraction, and other foundational NLP methods. Coverage of NLP models includes classical machine learning techniques and emphasizes deep learning techniques.
Course Type (CB27) :	• Lower Division
Mode of Delivery:	• Online • Hybrid
Faculty Initiator:	No value
Course Family:	Not Applicable

Faculty Requirements

Discipline 1:	• Computer Science
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 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 knowledge and hands-on experience in natural language processing, which is used in classical machine learning and large language models.

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 CSU only

Transferability Status

Approved

UC Transferable and/or Lower-Division Major Requirement

Will the course be UC transferable?

No

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

No Value

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

Minimum Credit Units	4.5
Maximum Credit Units	4.5
Total Course In-Class (Contact) Hours	66
Total Course Out-of-Class Hours	96
Total Student Learning Hours	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.

Funding Agency Category (CB23)

Not Applicable.

Cooperative Work Experience Education Status (CB10)

Variable Credit Course

Weekly Student Hours

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

Course Student Hours

Course Duration (Weeks)	12
Hours per unit divisor	36
Course In-Class (Contact) Hours	
Lecture	48
Laboratory	18
NA	0
Total	66
Course Out-of-Class Hours	
Lecture	96
Laboratory	0
NA	0
Total	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 natural language processing concepts in machine learning models, covering the Lab Topics specified in the Lab Outline section.

Methods of Evaluation

Methods of Evaluation	Methods of Evaluation
Methods of Evaluation	A. Assignments and quizzes are evaluated for completeness, correctness, and proper application of natural language processing in AI models. B. In-class problem solving and group collaborative problem solving are evaluated for the ability to apply natural language processing in AI models appropriately. C. One or more examinations with questions on natural language processing concepts and applications discussed in class. Submitted work will be graded on correctness and completeness. D. A comprehensive final examinations with questions on natural language processing concepts and applications discussed in class. 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
Daniel Jurafsky, James H. Martin	Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition with Language Models	None, ebook at: https://web.stanford.edu/~jurafsky/slp3/	January 2025, 3rd Edition	N/A

Suggested Reading List

No Value

Learning Outcomes

Course Objectives

Define Natural Language Processing (NLP) Scope and Applications
Evaluate the NLP Toolkits
Apply Data Preprocessing
Apply Feature Extraction
Discuss Neural Networks and Large Language Models
Apply Foundation Models
Investigate Ethics in NLP

CSLOs

Explain natural language processing concepts and implementation. Expected SLO Performance: 0.0

Apply and evaluate natural language processing algorithms in interpreting and manipulating human language applications. Expected SLO Performance: 0.0

Outline

Course Outline

A. Define Natural Language Processing (NLP) Scope and Applications
   1. History of NLP
   2. NLP Applications and Key Tasks
   3. Challenges in NLP

B. Evaluate the NLP Toolkits
   1. Text processing and string operations
   2. Regular Expressions
   3. Data in NLP
   4. Python tookits for NLP

C. Apply Data Preprocessing
   1. Tokenization, punctuation, case insensitivity
   2. Stopwords
   3. Stemming, lemmatization

4. Part of speech tagging, name entity recognition
5. Vectorization
6. Normalization

D. Apply Feature Extraction
1. Bag of words
2. N-gram
3. Word embedding
4. Term frequency: TF_IDF

E. Discuss Neural Networks and Large Language Models
1. Recurrent Neural Networks
2. Transformers
3. Difference between NLP and Large Language Models
a. Model complexity and resource requirements
b. Training Data
c. Application and performance

F. Apply Foundation Models
1. Text classification
2. Sentiment analysis
3. Machine translation
4. Summarization
5. Information retrieval

G. Investigate Ethics in NLP
1. Diverse data
2. Privacy
3. Ethical NLP practices

Lab Outline

A. Code, debug, and analyze string methods and regular expressions to select text in a document.
B. Code, debug, and analyze the outcome of data preprocessing: tokenization, removal of stopwords, stemming, lemmatization, part of speech tagging, name entity recognition.
C. Code, debug, and analyze the vectorization of preprocessed data: bag of words, TF-IDF, embedding.
D. Apply and analyze foundation models for sentiment analysis.
E. Apply and analyze foundation models for text classification.
F. Apply and analyze neural networks for machine translation.
G. Apply and analyze foundation models for summarization.
H. Apply and analyze foundation models for information retrieval.

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 5/28/258)

Req/Adv

Prerequisite(s):

CIS D017A and (CIS D017B, MATH D002B or MATH D02BH)

Corequisite(s):

No Value

Advisory(ies):

No Value

Advisory(ies) - Other:

No Value

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

Stage 7: Content Review Matrix Liaison

No Value

Stage 8: Dean of Online Learning

No Value

Stage 9: Articulation Officer

No Value

Stage 10: De Anza General Education

No Value

Stage 13: Curriculum Committee

No Value

CO

Sort ID (00 < 10; 0 < 100)

CIS 080

Course Status

New

Course Characteristics

- CTE

Cross-Listed/Related Course Information

- NA

Cross-Listed/Related Course ID's

No Value

DL Approval Date (MM/DD/YYYY)

06/17/2025

Hybrid Approval Date (MM/DD/YYYY)

06/17/2025

Curriculum Office Notes

No Value