Bachelor of Science in Applied Data Science

(This new state-support degree was approved by the CSULB Academic Senate on March 28, 2024, approved by the President on April 11, 2024, and approved by the CSU Chancellor's Office on June 13, 2024.)

The applied data science degree is designed to prepare graduates for a variety of careers within the data science field. The program builds upon a strong foundation of programming and data analysis to prepare data scientists who will be able to apply their skills to real-world applications. Graduates are prepared to join the data analysis workforce or pursue more advanced degrees. The degree involves courses in foundations of data science as well as application domains, such as public health, linguistics, Internet of Things, cybersecurity, etc. Students will choose their focus areas within applied data science by selecting a concentration.

Admission Requirements

Major Declaration

Freshmen admission to engineering majors is to a 'pre-major' status (i.e., Pre-Applied Data Science). Continuation in the major will be subject to meeting specific lower division course and GPA requirements at CSULB that indicate the student's ability to succeed and complete the major. Transfer applicants and CSULB students seeking admission into Applied Data Science must also meet similar major specific requirements. To become fully admitted into the Applied Data Science major, all prospective students (i.e., pre-majors, undeclared, major changes) must have a minimum cumulative 2.5 GPA and complete the following lower-division courses with a minimum grade of "C" prior to earning 60 units:

Core Lower-Division Major Requirements:

- CECS 180 – Data Computing for Everyone (3 units)
- CECS 174 Introduction to Programming and Problem Solving (3 units)

General Education Foundations Courses:

- Written and Oral Communication (Consistent with AB-928 no GE waiver is required).

Degree Progress

First-Time Engineering freshmen pre-major and transfer students must complete the Engineering Degree Progress Requirements within their first academic year. At the end of the second full semester, typically Spring, students who have not met the requirements must either declare another major or meet with an Academic Advisor from the Engineering Student Success Center (ESSC) to determine if the student's performance in the courses merits an additional Semester to complete. Such students must submit a Degree Progress Extension Petition with the College of Engineering Dean's Office.

First-Time Freshmen: A grade of "C" or better must be achieved in CECS 180 and CECS 174 within one calendar year.

Transfer Students : A grade of "C" or better must be achieved in CECS 181, CECS 228 and CECS 274 within one calendar year. There are no other special on-campus requirements.

All Engineering Majors:

All Engineering majors are expected to make satisfactory degree progress by completing attempted units, limiting repeats/withdrawals, satisfying critical benchmark courses in a timely manner, and maintaining minimum 2.0 Overall and Major GPAs. Degree Progress is monitored for all undergraduate students each semester. Petitions to attempt a course for the third time are only considered in extenuating circumstances. Students who are not making satisfactory degree progress as described above will have a hold on their registration and are required to meet with their advisor to develop an academic plan. Failure to satisfy the academic progress requirements will result in the student being disqualified from the major.

Course Requirements:

A grade of "C" or better must be achieved in all courses required for the major. A minimum of 120 units is required for the Bachelor's Degree.

Lower Division
Take all of the following:

- CECS 100 – Critical Thinking in the Digital Information Age (3) (*)
    - Prerequisite: ENGL 100B or GE Written Communication (Area A2).

- ENGR 101 Introduction to Engineering Profession (1) (*)
    - Prerequisite: Freshman standing or consent of instructor.

- ENGR 102 - Academic Success Skills (1 unit) (*)
    - Prerequisite: ENGR 101 with a grade of “C” or better

- CECS 105 - Introduction to Computer Engineering and Computer Science (1 unit) (*)

- CECS 174 Introduction to Programming and Problem Solving (3 units)
    - Corequisite: MATH 122

- CECS 180 Data Computing for Everyone (*)
    - Prerequisite: None

- CECS 181 Intro to Data Science
    - Prerequisites: CECS 180 or equivalent all with a grade of “C” or better.

- CECS 228 Discrete Structures with Computing Applications
    - Prerequisites: CECS 174 and MATH 122 all with a grade of "C" or better.

- CECS 229 Discrete Structures with Computing Applications II
    - Prerequisites: CECS 228 with a Grade of "C" or better

- CECS 274 Data Structures
    - Prerequisite: CECS 174 with a grade of "C" or better.

- CECS 280 Data Mining
- Prerequisite: CECS 181 with a grade of "C" or better.

- CECS 281 Introduction to Data Visualization for Data Science
    - Prerequisite: CECS 181 with a grade of "C" or better.

Upper Division
Take all of the following:

- CECS 328 Algorithms
    - Prerequisite: CECS 228 and(CECS 274 or CECS 275), all with a grade of "C" or better.

- CECS 381 Stochastic Computing (3 units)
    - Prerequisite: CECS 229 with a grade of "C" or better.

- ENGR 350 Computers, Ethics and Society (*) (3 units)
    - Prerequisites: Completion of at least 60 units.

- ENGR 361 Scientific Research Communication (**) (3 units)
    - Prerequisite: G.E. foundation courses; score of 11 or higher on the GWAR
    - Placement Examination or successfully completed the necessary portfolio course that is a prerequisite for a GWAR Writing intensive Capstone.

- CECS 351 Social Data Analysis and Computing (3 units)
    - Prerequisites: CECS 280 with a grade of "C" or better.

- CECS 451 Artificial Intelligence
    - Prerequisites: CECS 328 with a grade of "C" or better.

- CECS 456 Machine Learning
    - Prerequisites: CECS 381 or EE 381 with a grade of "C" or better.

- CECS 478- Introduction to Computer Security (3 units)
    - Prerequisite: CECS 328 or CECS 346 with a grade of "C" or better.

- CECS 492A- Applied Data Science Senior Project I (*) (3 units)
    - Prerequisite: ENGR 350 and CECS 456 with a grade of "C" or better.

- CECS 492B- Applied Data Science Senior Project II (3 units)
    - Prerequisite: CECS 492A with a grade of "C" or better.

Take eighteen units from one of the following focus areas (Analytical Public Health or Computational Linguistics) and take nine units of elective courses from any of the focus areas:

Analytical Public Health:

6 required courses (18 units)

• HSC (PPH)- 360 The Role of Data (PHIT-B) (3 Units) [New course]

• HCA 419 Healthcare Database Management (3 units) [New course]

• HCA 420 Healthcare Data Visualization (3 units) [New course]

• HCA 421 Healthcare Data Science Capstone (3 units) [New course]

• HSC (PPH)- 460-A Emerging Technologies for the Public Health Informatics and Technology (PHIT-C) (3 Units) [New course]

• HSC (PPH)- 460-B Public Health Maps and Spatial Analysis for Health Equity Informatics and Technology (PHIT-D) (3 Units) [New course]

Elective courses

• HSC (PPH)- 260 Introduction to Public Health Informatics and Technology (PHIT-A) (3 Units) [New course]

• HCA 300 The Health Care System (3 units)

• HSC 400 Principals of Epidemiology (3 Units) [New course]

• HSC 403 Community Health Statistics (3 Units) [New course]

• HCA 416 Mgmt & Info Systems (3 units)

- Corequisite: HCA 300

• HCA 417 Technology, Ethics and Society (3 units)

• HSC 420 Global Health (3 units) [New course]

• HCA 428 Population Health Management (3 units)

- Corequisite: HCA 300

• HCA 450 Quality Assurance in Healthcare (3 units)

- Prerequisite: HCA 300

Computational Linguistics:

18 required units:

- LING/ANTH 170 Introduction to Linguistics
- LING 325 Modern English Grammar
- LING 350 Natural Language Processing
- LING 401 Corpus Linguistics

- LING 423 Semantics
- LING 424 Laboratory Phonetics

Electives:

- LING 301 Research Methods
- LING 379 Sociolinguistics
- LING 420 Phonology
- LING 421 Syntax
- LING 422 Discourse
- LING 438 Psycholinguistics

EFFECTIVE: Fall 2025

Academic Plan Code: CECSBS05U1 (Concentration Code: 01)

CIP: 30.7001

CSU Code: 17035

Career: Undergraduate

College: 52, College of Engineering

Department: Computer Engineering and Computer Science

Delivery: Face-to-face

STEM Eligible