CAL POLY HUMBOLDT
University Senate

Resolution to Recommend Database and Data Analysis Certificate
X-24/25-ICC- - February 11, 2025 – Curriculum Reading

RESOLVED: That the University Senate of Cal Poly Humboldt recommends to the Provost that the Database and Data Analysis Certificate detailed in proposal 24-2474 be approved.

RATIONALE: Data is often stored in a relational database and the ability to manage and query such structures is highly sought after in many careers. Additionally, a common in-depth data analysis pipeline (including cleaning, exploratory analysis, visualization, and prediction) is implemented agnostic to a specific field (i.e., the same pipeline could be applied to genomics data or to election data to extract insights). Familiarity with this pipeline equips our students to tackle a variety of data-driven problems and to bring value to an organization.

Humboldt has launched a new Data Science major but currently does not have a way to target students in other majors who would like to obtain marketable data science skills other than offering our courses as electives with no coherent program. Moreover, it is challenging to communicate to individual students which specific courses would be most helpful for specific career skills (this is usually done between students and advisors and requires the advisors to know the course specific content, the current field which is rapidly evolving, and what our department offers).

By selecting coursework and packaging it into a tangible certificate that students can list on a resume, we will better be able to serve our students. Additionally, our data science courses weave the theme of "Data for Good" throughout– this is directly in line with Humboldt's commitment to environmental and social justice and is good both for the University and for our students.

Specific to the Databases and Data Analysis Certificate, students will have the opportunity to learn how data is stored and accessed and to work through multiple projects using a common data science pipeline. The projects give students a chance to demonstrate written and oral communication, teamwork, and quantitative reasoning, and directly build a portfolio of work that can be shown to potential employers.

Certificate Description:
The Cal Poly Humboldt Database and Data Analysis Certificate provides an opportunity to work through the entire data storage, retrieval, and analysis pipeline in an applied context, integrating data cleaning, exploratory analysis, visualization, predication, and validation. Prerequisites: Data Cleaning and Visualization Certificate, MATH 101, or an equivalent high school class or a specific ALEKS placement score of over 65.

Includes the Following Courses:

- <u>STAT 109: Introductory Biostatistics (4 units)</u>: Descriptive statistics, probability, random variables, discrete and continuous distributions, confidence intervals, contingency tests, regression and correlation, tests of hypothesis, analysis of variance. Emphasis: methods and applications used in the biological and natural resource sciences.
    - May be substituted for an advisor approved alternative.
- <u>CS 325 Database Design (4 units)</u>: Introduction to database design and implementation. Relational model, entity-relationship model, and diagrams, converting a model to a schema, elementary Structured Query Language (SQL), normalization.
- <u>DATA 311 Applied Data Analysis (4 units)</u>: This team- and project-based course provides an opportunity to work through the entire data analysis pipeline in an applied context. Three modules cover (1) cleaning and exploring data, (2) visualizing data and (3) prediction, validation, and uncertainty estimation. Students will advance written and verbal communication skills by reporting their findings.

Humboldt currently offers the courses we are suggesting in each certificate. They are all courses in the Mathematics Department or the Computer Science Department. There is currently excess capacity in these courses, so this is an efficient way to use existing courses.

Related Certificates:

- [Data Cleaning and Visualization Certificate - 23-2462](#)
- [Machine Learning Certificate - 23-2475](#)