

**CAL POLY HUMBOLDT**

**University Senate**

**Resolution to Recommend Approval of the Science, Technology, Engineering, and Mathematics Education MA**

02-25/26-ICC – December 9, 2025 – Curriculum Reading

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**RESOLVED:** That the University Senate of Cal Poly Humboldt recommends to the Provost that the Science, Technology, Engineering, and Mathematics Education MA (30 units) detailed in [Proposal 24-2875](#) be approved.

**RATIONALE:** The Master of Arts in STEM Education (M.A. in STEM Education) is a two-year, hybrid graduate program designed to prepare highly qualified and culturally sustaining STEM educators who can address the growing shortage of science and mathematics teachers regionally and statewide.

This program serves individuals who have completed an undergraduate degree in a STEM discipline and are seeking professional careers as STEM educators. It offers three distinct tracks (Secondary Education, Elementary Education, and Self-Designed Studies of STEM Education) allowing students to tailor their professional preparation to their specific goals. Students in the elementary and secondary tracks earn a Preliminary Teaching Credential from the California Commission on Teacher Credentialing during their first year of study, while the second year emphasizes graduate-level research, professional development, and advanced coursework focused on equitable STEM teaching practices.

The program's first year consists of track-specific credential coursework, while the second year, offered fully online, forms the core of the degree, structured as a Professional Learning Community (PLC). This model fosters collaboration across disciplines and professional settings, creating enduring professional networks that support teacher retention and ongoing growth in STEM education.

Graduates of the M.A. in STEM Education program will emerge as teacher leaders and community experts, equipped with both the pedagogical content knowledge and critical frameworks necessary to advance STEM learning and equity in California's K-12 and informal educational systems.

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**PROGRAM OVERVIEW:**

**Total Units:** 30

**Program Length:** Two years (hybrid format)

**Degree Type:** Master of Arts

**Target Students:** Individuals holding a qualifying baccalaureate degree in a STEM discipline

**Structure and Delivery: Hybrid Model:** Core courses offered in online or hy-flex format, providing flexibility for practicing teachers.

### Coursework Breakdown:

- **Core Courses (15 units):**
  - EDUC 614 – Advanced Teaching Methods in STEM Education
  - EDUC 615 – Critical STEM Teaching and Learning
  - EDUC 616 – Practitioner Inquiry in STEM Education
  - EDUC 617 – Curriculum and Theory in STEM Education
  - EDUC 618 – Science, Technology, and Society.
- **Electives (12 units):** Selected from credential coursework or self-designed studies aligned with the student's track.
  - **Option 1: Elementary Education (Multiple-Subject Credential):** Completed primarily in person during Year 1, with online coursework during Year 2. Students in this track will complete coursework and practicum experiences that satisfy multiple-subject credential requirements while integrating advanced training in math and science education for elementary learners. Coursework emphasizes multicultural education, language development, and integrated curriculum design.
    - EED 721 – Multicultural Foundations (2 units)
    - EED 722 – English Language Skills and Reading (2 units)
    - EED 723 – Integrating Math/Science in Elementary School (4 units)
    - EED 728 – History/Social Science in the Integrated Elementary Curriculum (2 units)
    - EED 733 – Teaching English Learners (2 units)
  - **Option 2: Secondary Education (Single-Subject Credential):** Available online or in person; includes an internship option for employed teachers. Students in this track will complete coursework that satisfies credentialing requirements in the STEM areas of biology, chemistry, geoscience, industrial technology, mathematics, or physics. Coursework emphasizes culturally sustaining pedagogy, bilingual education, and inclusion in secondary STEM classrooms. Electives
    - SED 715 – Multicultural Education (2 units)
    - SED 730 – Bilingual/ELD Theory and Method (3 units)
    - SED 737 or SED 740 – Secondary Curriculum Instruction: Math or Science (2 units)
    - SED 743 – Content Area Literacy (3 units)
    - SED 776 – Teaching in Inclusive Classrooms (2 units)
  - **Option 3: Self-Designed Studies of STEM Education:** Available online or in person, depending on course selection. Students in this track will complete self-selected coursework related to STEM Education with the consent and advising support of the program coordinator.
    - Example courses that students can consider: Single or Multiple Subject Teaching Credential Program courses, MA in Education courses, or master's-level and upper-division courses offered through the College of Natural Resources & Sciences (*science disciplines, mathematics, and computer science*), as well as graduate independent study options as approved by the program coordinator.

- **Culminating Experience (3 units):** EDUC 690 or EDUC 692 – Thesis or Project, with a required oral defense.

**Program Outcomes:** Graduates will:

1. Examine and apply STEM Education Structures and Standards: Analyze the historical, philosophical, and contemporary frameworks of STEM education, including how they reinforce or challenge social inequities and dominant narratives.
2. Apply Critical Theoretical Frameworks in STEM Education: Utilize diverse theoretical perspectives, such as Critical Race Theory, Feminist Science Studies, and Indigenous Knowledge Systems, to inform STEM teaching, curriculum development, and research.
3. Develop Rigorous and Inclusive STEM Teaching Practices: Design and implement STEM discipline-specific pedagogical strategies that promote rigorous learning and foster equity, inclusion, and justice in STEM classrooms.
4. Engage in Practitioner Inquiry and Ethical Research in STEM Education: Conduct systematic research on STEM teaching and learning using action research, self-study, and participatory methodologies while addressing ethical considerations such as power, positionality, and research impact.
5. Analyze the Societal Impact of STEM Education, Knowledge, and Innovations: Investigate the cultural, political, and economic influences on STEM advancements, policies, and public engagement, examining issues such as environmental justice, digital divides, and diverse epistemologies.

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**PROGRAM PURPOSE AND STRENGTHS:** The M.A. in STEM Education prepares educators who can address the severe shortage of qualified STEM teachers in California and across the nation. According to the California State University Mathematics and Science Teaching Initiative (MSTI), the state will need at least 33,000 new STEM educators over the next decade. Locally, Humboldt and Del Norte Counties face particularly acute shortages, with many middle and high school math and science classrooms staffed by teachers without full subject-matter credentials.

This program strengthens Cal Poly Humboldt's existing teacher preparation infrastructure by integrating with current credential programs (Elementary and Secondary Education), allowing students to earn their credential and M.A. in an efficient, sequential format. It also expands the university's graduate portfolio, reinforcing its leadership in applied, equity-focused, and interdisciplinary education.

The program aligns with Cal Poly Humboldt's polytechnic commitments to applied learning, sustainability, and collaboration across disciplines. It promotes:

- **Project-based and experiential instruction**, emphasizing inquiry-driven teaching and learning.
- **Interdisciplinary integration**, uniting science, technology, engineering, and mathematics with critical frameworks and community engagement.
- **Regional workforce development**, by producing highly trained STEM educators for local schools, community colleges, and informal education settings.

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**PROGRAM RELEVANCE AND IMPACT:** The M.A. in STEM Education directly supports California's and the nation's workforce priorities by addressing urgent teacher shortages in math and science. A 2023 report from the National Science Board and National Science Foundation emphasizes that elementary and secondary education in these subjects forms the foundation for a strong STEM workforce and innovation economy. The same report highlights the decline in student math and science achievement following the pandemic, as well as widening equity gaps.

By producing educators who are both scientifically literate and critically informed, Cal Poly Humboldt's program helps reverse these trends. Graduates will be uniquely prepared to support diverse learners, particularly in rural, Indigenous, and under-resourced communities, through culturally responsive and evidence-based instruction.

Beyond classroom teaching, graduates will be qualified for leadership roles in:

- STEM Curriculum Development and Instructional Coaching
- Community-Based and Informal STEM Education (e.g., museums, environmental centers, nonprofits)
- Higher Education and Teacher Preparation programs as mentors and instructors

These outcomes align directly with the California Commission on Teacher Credentialing, the CSU's workforce mission, and the California Department of Education's equity initiatives.

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**RESOURCE CONSIDERATIONS:** The M.A. in STEM Education will launch using existing faculty expertise and credential program infrastructure. The program's hybrid design allows for cost-effective delivery and statewide access.

- Faculty: Instruction will be provided by current faculty in the School of Education, with potential collaboration from STEM departments.
- Facilities: No new facilities are required; existing classrooms and online learning platforms are sufficient.
- Technology: Courses will use Humboldt's current online learning tools and the university's support for hy-flex instruction.
- Future Growth: As enrollment increases, additional graduate advising and instructional support may be needed to sustain quality and meet student demand.

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**COMMUNITY AND STATE PARTNERSHIPS:** The program was developed in collaboration with regional and statewide education partners, including:

- Humboldt County Office of Education
- Humboldt Teacher Shortage Taskforce
- Humboldt Education Workforce Partnership
- College of the Redwoods
- Blue Lake Rancheria's *Grow Your Own Educator* initiative
- Regional school administrators and community leaders

These partnerships ensure that the program remains responsive to workforce needs, culturally sustaining practices, and community-defined goals for improving STEM literacy and teacher retention.

#### **Related Courses and Proposals:**

- [EDUC 614 - 25-3159 - New Course - Advanced Teaching Methods in STEM Education](#)
- [EDUC - 615 - 24-3010 - New Course - Critical STEM Teaching and Learning](#)
- [EDUC - 616 - 24-3011 - New Course - Practitioner Inquiry in STEM Education](#)
- [EDUC - 617 - 24-3012 - New Course - Curriculum and Theory in STEM Education](#)
- [EDUC - 618 - 24-3013 - New Course - Science, Technology, and Society](#)

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**Updates Made Since the October 14, 2025 Senate Reading:** (These updates reflect revisions to the program following ICC and Senate feedback and are provided for transparency and clarity.)

#### **Curriculum Update Overview**

- Core sequence revised:
  - Added EDUC 614 – Advanced Teaching Methods in STEM Education.
  - Removed the prior option of EDUC 610 or a STEM discipline course from the core, replacing it with a required, purpose-aligned graduate course.
  - Retained EDUC 615, 616, 617, and 618.
- Elective pathways updated:
  - The previous Higher Education & Informal STEM Education option was replaced with Option 3: Self-Designed Studies of STEM Education, allowing students to design an individualized 12-unit plan with advisor approval.
  - Elementary Education (EED) and Secondary Education (SED) elective lists were retained and clarified.
- Program Learning Outcomes (PLOs) Updates
  - Expanded to emphasize:
    - Application of STEM education structures and standards.
    - Development of rigorous and inclusive STEM teaching practices.
    - Engagement in practitioner inquiry and ethical research.
  - Updated PLO language includes:
    - Examine and apply STEM Education Structures and Standards.
    - Develop Rigorous and Inclusive STEM Teaching Practices.
    - Engage in Practitioner Inquiry and Ethical Research in STEM Education.
- Student Learning Outcomes (SLOs) Updates
  - Expanded to align explicitly with Common Core State Standards for Mathematics (CCSS-M) and Next Generation Science Standards (NGSS).
  - Added SLOs include:
    - Interpret and apply structures and progressions of CCSS-M and NGSS.

- Design advanced STEM lessons aligned with CCSS-M and NGSS, incorporating appropriate practices, representations, and performance expectations.

These updates strengthen clarity, rigor, and alignment with statewide standards, CSU graduate expectations, and feedback received during committee review.

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*Note on Document Preparation: Portions of this resolution were developed with the support of artificial intelligence tools to enhance consistency, formatting, and clarity. All content originates from the official proposal documents and aligns with Chancellor's Office documentation standards. Each resolution is reviewed and finalized collaboratively by the Integrated Curriculum Committee Chair, committee members, and the proposal authors, with opportunities for revision prior to submission for Senate consideration.*