

CAL POLY HUMBOLDT
University Senate

**Resolution to Recommend Science, Technology, Engineering, and
Mathematics Education MA - 24-2875**

02-25/26-ICC – October 14, 2025 – Curriculum Reading

RESOLVED: That the University Senate of Cal Poly Humboldt recommends to the Provost that the Science, Technology, Engineering, and Mathematics Education MA (PROGRAM: 2026-27 New Degree Proposal Form (Chancellor's Office)) detailed in [Proposal 24-2875](#) be approved.

RATIONALE: The purpose of the MA in STEM Education is to prepare highly qualified and culturally sustaining STEM educators to address the lack of science and math educators both regionally and across the nation (Prothero, 2024). Locally, the California State University Mathematics and Science Teacher Initiative (California State University, n.d.) suggests that the state will need at least 33,000 new STEM educators over the next decade. Graduates of the program will earn a Preliminary Credential from the California Commission on Teacher Credentialing and will gain advanced expertise in the field of STEM education through additional coursework and the completion of an action research project. This unique combination will position graduates of the program as teacher leaders and community experts with the skills and knowledge needed to support STEM learning and associated professional pathways in Humboldt County and beyond. The design of this program recognizes the specialized pedagogical content knowledge that STEM educators need to support the success of diverse learners. Students of the program will be introduced to research-based curricular and pedagogical models aligned with California State Standards in STEM Education, as well as to interdisciplinary scholarship that enables the promotion of STEM literacy for all learners. A STEM literate population is an increasingly crucial educational priority in the twenty-first century, especially given Cal Poly Humboldt's mission of "providing the highest quality and affordable college education built on the contributions of diverse students, faculty, and staff in pursuit of a more just and sustainable world".

The two-year program is designed to support candidates during their completion of the requirements for earning preliminary teaching credentials, and through their first year as a practicing teacher. Research has demonstrated that ongoing relationships with universities can greatly enhance first-year teachers' ability to persist in the profession (Thomas et al., 2019). The program functions as a Professional Learning Community, enabling students to develop lasting professional networks that are also linked to retention in STEM teaching careers (Townley, 2020). As Cal Poly Humboldt continues its role as a leader in applied STEM disciplines and professions, this program will help provide the local educational infrastructure needed to support this work.

The MA in STEM Education program is designed to integrate with the existing credential programs at Cal Poly Humboldt, strengthening the university's existing capacity to produce

high-quality K-12 STEM teachers. After completing a credential program, students would be able to complete the remaining courses comprising the core of MA in STEM Education program within one year while teaching full-time. The proposed program consists of 15-units of core courses, combined with 12-units of elective courses aligned with existing credential programs, and a 3-unit capstone course that guides students through the design and implementation of an action research project that can be communicated with relevant practitioners and community stakeholders.

The proposed MA in STEM Education at Cal Poly Humboldt aligns closely with the university's strategic academic priorities, reinforcing its commitment to equity-focused, interdisciplinary, and applied learning. As Cal Poly Humboldt continues to expand its role as a polytechnic institution, the MA in STEM Education will contribute to the development of a highly skilled STEM workforce and address critical regional and statewide educational needs.

Cal Poly Humboldt's transition to a polytechnic university emphasizes hands-on, applied learning and interdisciplinary approaches to problem-solving. The MA in STEM Education reflects this vision by:

- Integrating STEM content knowledge with innovative pedagogy, ensuring graduates can teach STEM subjects effectively in real-world contexts.
- Emphasizing project-based and experiential learning, preparing future educators to teach STEM through inquiry-based and hands-on approaches that mirror Cal Poly Humboldt's broader educational philosophy.
- Supporting regional workforce development by preparing STEM educators who will contribute to the local and state economy by increasing STEM literacy and workforce readiness among K-12 students.

A critical component of Cal Poly Humboldt's strategic plan is engagement with local and Indigenous communities, particularly in rural and under-resourced areas. The university's academic planning emphasizes sustainability, social justice, and interdisciplinary collaboration—all of which are central to the MA in STEM Education. Finally, as part of Cal Poly Humboldt's growth as a polytechnic university, expanding high-quality graduate programs is a key priority. The MA in STEM Education will:

- Enhance the university's graduate education portfolio, attracting students interested in both STEM content and innovative teaching practices.
- Provide opportunities for applied research and action-based learning, allowing graduate students to conduct field-based research on STEM education effectiveness.
- Support teacher leadership and professional development, positioning graduates as instructional leaders who can mentor future educators and contribute to regional school improvement efforts.

The MA in STEM Education aligns with CSU graduate education criteria by ensuring:

- Depth of Knowledge and Research Integration – Coursework will emphasize discipline-specific knowledge while engaging students in educational research and evidence-based practices.

- Graduate-Level Academic Rigor – The program will include critical analysis, independent inquiry, and research-based decision-making, ensuring that graduates can contribute to STEM education scholarship and practice.
- Professional Preparation and Impact – Graduates will be well-positioned to address the shortage of STEM educators, particularly in high-need areas such as rural Northern California, supporting workforce development and K-12 student success.

By offering the MA in STEM Education, Cal Poly Humboldt will prepare educators who not only excel in STEM instruction but also advocate for equitable, innovative, and place-based teaching practices—advancing both the university’s mission and statewide educational goals.

Program Learning Outcomes:

Upon graduation from the MA in STEM Education program, students will be able to:

1. *Critically Examine STEM Education Structures: 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 Equitable and Inclusive STEM Teaching Practices: Design and implement pedagogical strategies that promote equity, inclusion, and justice in STEM classrooms, integrating culturally responsive and sustaining practices.*
4. *Engage in Practitioner Inquiry and Ethical Research: 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.*

Coursework Overview:

The courses in this program involve a combination of 12 elective units, 15 units of core courses, and 3 units associated with the culminating experience, either a project or thesis. The elective units are aligned with three different pathways corresponding to different STEM education professional tracks: Elementary Education, Secondary Education, and Higher Education and Informal STEM Education. During the first year of the program, students will take coursework that satisfies the elective components. In the second year, students from all three elective options will come together as a cohort to complete the core courses. The elective units aligned with the Elementary and Secondary Education programs are a subset of the courses taken by all students to earn multiple-subject or single-subject credential. The majority of students in these pathways will complete all requirements for their credential, and 12 units from that program of study will be applied towards the graduate degree. Total units required to complete the degree: **30 units**

Core Courses (15 units)

EDUC 610- Education and Society, 3 units, OR an upper-division/ graduate course from a STEM discipline aligned with a student's instructional goals, selected in consultation with STEM faculty.

EDUC 615- Critical STEM Teaching and Learning, 3 units

EDUC 616- Practitioner Inquiry in STEM Education, 3 units

EDUC 617- Curriculum and Theory in STEM Education, 3 units

EDUC 618- Science, Technology, and Society, 3 units

Electives (12 units)*Option 1: Elementary Education:*

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

SED 715- Multicultural Education, 2 units

SED 730- Bilingual/ ELD Theory and Method, 3 units

SED 737 or 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: Higher Education and Informal STEM Education

EDUC 620- Pedagogy, 3 units

EDUC 645- Academic Writing, 2 units

EDUC 655- Educational Research, 3 units

EDUC 682- Mixed Methods Research in Education, 4 units

Culminating Experience

EDUC 690 or EDUC 692, Thesis or Project, 3 units

Students in this program may select between a project and a thesis for their culminating experience. Students who pursue elective options 1 and 2, aligned with existing credential programs, will complete an action research project or other form of practitioner inquiry grounded in their work as STEM educators. Students who pursue election option 3 may choose between a project or thesis for their culminating experience. Students in all elective options will submit a proposal and receive approval aligned with coursework in EDUC 616, taken in the fall of the second year of the program. There is a required oral defense for both theses and projects, either in person or via video conferencing.

Related Courses and Proposals:

- [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](#)