

# Master of Arts in STEM Education

(Program Code: STEM)

The MA in STEM Education program is a Master's degree program for students who wish to advance their professional knowledge and skills in STEM Education. The program is to prepare STEM educators and leaders to more effectively teach, engage, and inspire a diverse population of students in the STEM fields. Through an advanced course of study, this program provides candidates with specialized experiences that will enhance their knowledge, skills and dispositions that prepare them to become expert STEM educators and leaders who will advance STEM education, either in discipline-specific or integrated settings, in K-12 schools and other informal contexts. With an emphasis on interdisciplinary perspectives, the goal of the program is to prepare STEM educators and leaders who will be able to prepare all students to become active and informed citizens in an ever more technological and complex world; and to build the educational foundation for future STEM-related careers through engaging them in authentic inquiry, real world problem-solving, critical and creative thinking, productive collaboration and effective communication.

The program curriculum focuses on integrating mathematics, science, technology, and engineering concepts across disciplines through facilitating a broader understanding of the interdisciplinary nature of STEM, a deeper discipline-specific pedagogical content knowledge, equitable teaching strategies, and integrative approaches for the teaching and learning of STEM content. The program curriculum includes research in STEM Education, assessment, foundations in STEM Education, technology and engineering in STEM Education, advanced teaching methods in STEM Education and culminating experience. These courses are to enhance teachers' knowledge and practice in STEM education through student-centered, integrated teaching approaches, hands-on experiences, collaborations and reflections, with a focus on Common Core State Standards for Mathematics and the Next Generation Science Standards.

The audience of the program will be primarily single subject and multiple subject credential students to further their knowledge and practice in STEM Education. This program will also offer valuable knowledge and skills in teaching STEM to K-12 CTE (Career and Technical Education) teachers, special education teachers and informal STEM educators. Students in the MA program will be supported to add foundational level mathematics, foundational level science, mathematics, subject-specific science, and computer science teaching authorizations.

The College of Education previously had a MA in Education: STEM Education option program at CSUSB. It was a two-year program and mainly recruited practicing teachers. In the Quarter-to-Semester conversion process this program was not transferred into the semester system. Thus, we are proposing a new MA in STEM Education program to replace the former program. The proposed program is designed to serve similar purposes. In addition, the proposed program aims to expand the enrollment by integrating with the single and multiple subject credential programs at CSUSB and reducing the number of the semesters required to complete the program.

The MA in STEM Education program is designed to integrate with the single and multiple subject credential programs at CSUSB, thus forming a pipeline of producing high-quality K-12 STEM teachers. After completing the credential program, students could complete the MA in

STEM Education program within one year while teaching full time. The MA in STEM Education program has five core courses (15 credit units), one culminating experience course (project/thesis, or advanced topics in STEM Education with comprehensive exam, 3 credit units), and 12 credit units of elective courses. The elective courses allow CSUSB credential students to bring up to 12 credit units from their teaching credential program and students from other institutions to transfer up to 9 credit units from their previous post-baccalaureate programs. If students have 12 credit units transferred from their credential programs, they can complete the program within two semesters (nine months). They will take 9 credit units per semester and this allows them to teach full time while doing the master's program. A student could earn a single- or multiple- subject teaching credential and a master's degree in STEM Education at CSUSB within two years.

## University Admission

- Have completed a four-year college degree program at an accredited institution with a 3.0 or above GPA for the last 60 semester or 90 quarter units. Students with 2.5 to 3.0 GPA may be admitted conditionally.
- Complete the online application at Cal State Apply (<http://www.calstate.edu/apply/>)
- Submit an application fee of \$70.00
- Submit one (1) copy of official transcripts from all colleges and universities you attended.

## Program Admission

In addition to the university Graduate School admission requirements (<https://www.csusb.edu/graduate-studies/prospective-students/how-apply/admissions-requirements/#:~:text=If%2012%20or%20more%20semester,then%20the%20GPA%20is%20acceptable&text=If%20an%20applicant%20has%20a,or%20above%2C%20they%20are%20admissible>), additional requirements for admission to classified graduate status are:

1. Relevant K-12 teaching experiences including but not limited to: public or private school teaching, substituting teaching, and teaching in informal settings.
2. Two letters of recommendation, from individuals familiar with the applicant's work history or educational background.
3. Students need to attend an information meeting with the program coordinator and/or the admission advisor before submitting their application. An advising form will be submitted together with other application materials.

Students who do not meet these criteria may be admitted as conditionally classified graduate students. Change to classified standing can be made only with approval of the College of Education. No more than 15 semester units may be used to demonstrate fitness to complete the program.

## Advancement to Candidacy

In order to be advanced to candidacy, a student must have:

1. Achieved classified standing;

2. Met Writing Requirement for Graduate Candidacy;
3. Completed with a grade point average of 3.0 ("B"), at least 15 semester units of applicable coursework in graduate standing, at least 12 of which have been taken at this campus and approved by an advisor in the College of Education;
4. Between the time of completing 12 units and 15 units of applicable course work, the student is required to apply for advancement to candidacy.
5. Satisfactorily completed ESTM 6103, ESTM 6203, ESTM 6303 and ESTM 6503,
6. Filed an official "Graduate Approved Program Plan." This must be approved by the student's advisor and the graduate coordinator of the program.

## Requirements for Graduation

1. A minimum of 30 semester units of acceptable graduate-level work, with a minimum of 21 completed in residence at this university;
2. A grade point average of 3.0 (grade of B) or better in all courses taken to satisfy the requirements for the degree;
3. Graduate students are required to complete the Writing Requirement for Graduate Candidacy before being classified or advanced to candidacy. There are three options a student can choose from to meet the writing requirement.
  - The student completes ESTM 6103 or ESTM 6503 and attains a grade of B or better.
  - The student scores an acceptable standardized test score (WREE or GRE).
  - The student submits a paper(s) that will receive a passing score according to the approved rubric ([http://coe.csusb.edu/sites/default/files/PaperEvaluationCriteria\\_WritingRequirement.pdf](http://coe.csusb.edu/sites/default/files/PaperEvaluationCriteria_WritingRequirement.pdf))
4. Successful completion of comprehensive examination, a thesis or project.
  - Comprehensive Examination
 

A comprehensive examination is an assessment of the student's ability to integrate the knowledge of the area, show critical and independent thinking, and demonstrate mastery of the subject matter. The results of the examination evidences independent thinking, appropriate organization, critical analysis and accuracy of documentation. A record of the examination questions and responses shall be maintained in accordance with the records retention policy of The California State University.

Students are required to take ESTM 6953 Advanced Topics in STEM Education concurrently with or prior to taking the Comprehensive Examination. Students may not take the examination more than three times.
  - Thesis
 

A thesis is the written product of a systematic study of a significant problem. It identifies the problem, states the major assumptions, explains the significance of the undertaking, sets forth the sources for and methods of gathering information, analyzes the data, and offers a conclusion or recommendation. The finished product evidences originality, critical and independent thinking, appropriate organization and format, and thorough documentation. Normally, an oral defense of the thesis is required.

A thesis must be planned in consultation with the student's first and second readers. The thesis proposal must be approved by the student's both readers, at least one of whom must be from the College of Education. The thesis also must be approved by the first and second readers and submitted in the approved format. An oral defense of the thesis is required.

- MA Project

A project is a significant undertaking appropriate to the fine and applied arts or to professional fields. It evidences originality and independent thinking, appropriate form and organization, and a rationale. It is described and summarized in a written abstract that includes the project's significance, objectives, methodology and a conclusion or recommendation. An oral defense of the project may be required.

A project will be planned in consultation with the student's first and second readers. The project proposal must be approved by the student's both readers, at least one of whom must be from the College of Education. The project also must be approved by the first and second readers and submitted in the approved format. The project can be reported in the form of a paper and/or other media. Both media and non-media projects require a final written report. An oral defense of the project is required.

5. The graduation requirement should be completed within 7 years from the date of matriculation.
6. Any additional general requirements not cited above and listed in Graduate Degree and Program Requirements website.

The program may not include more than 9 semester units in approved extension and transfer courses from other colleges.

### Core Courses (15)

ESTM 6104	Foundations of STEM Education	3
ESTM 5114	Technology and Engineering in STEM Education	3
ESTM 6203	Advanced Teaching Methods in STEM Education	3
ESTM 6134	Assessment in STEM Education	3
ESTM 6344	Research Methods in STEM Education	3
<b>Electives (12)</b>		<b>12</b>

Option 1. Elementary Education (12 units from the following courses)

EMAT 5101	Education, Diversity and Social Justice
EDMS 5104	Mathematics Teaching and Learning
EDMS 5105	Science Teaching and Learning
EDMS 4100	Psychological Foundations of Education
EDMS 4102	Pedagogical Foundations for Teaching English Learners

Option 2. Secondary Education (12 units from the following courses)

ESEC 6002	Educational Equity and Advocacy
ESEC 6003	Pedagogical Foundations for English Language Learners in Secondary Classrooms
ESEC 6004	Adolescent Development and Educational Theory
ESEC 6013	Methods of Teaching in the Content Areas: Mathematics

ESEC 6016 Methods of Teaching in the Content Areas: Science

Option 3. 5000- and 6000- level courses related to STEM Education with consent of program coordinator.(12 credit units) Example programs that students can take courses for electives are: Single or Multiple Subject Teaching Credential Program, MA in Education, MA in Instructional Technology, MA in Career and Technical Education, Master level or upper level courses in the College of Natural Sciences (science disciplines, mathematics and computer science).

## Culminating Experience: Exam/Thesis/Project

Students must complete one of the following options

Option A: Comprehensive Examination Option

ESTM 6954	Advanced topics in STEM Education	3
ESTM 6980	STEM Education: Comprehensive Examination	0

Option B: Master's Thesis/Project Option (choose one)

ESTM 6973	STEM Education Master Thesis	3
ESTM 6963	STEM Education Master Project	3