

Science, Technology, Engineering, and Mathematics Education (STM)

STM 180, 280, 380 Topics in Teaching Science, Technology, Engineering, and Mathematics 1-3 Hours

Classroom applications of research in science, technology, engineering, and mathematics education, and related policy issues.

STM 180.1, 280.1, 380.1 Quantitative Research Methods for STEM Educators 1-3 Hours

Survey of quantitative research methods in STEM education with applications to critical issues in teaching and learning. Methods reviewed include t-test, ANOVA, Chi-squared, and correlation and regression.

STM 180.2, 280.2, 380.2 Qualitative Research Methods for STEM Educators 1-3 Hours

Survey of qualitative research methods in STEM education with applications to critical issues in teaching and learning. Methods reviewed include grounded analysis, case studies, ethnographies, clinical interviews and surveys. Students read and critique examples from the published literature, and design (but do not necessarily implement) a study of their own.

STM 385 Knowing and Learning in STEM Education 3 Hours

Different approaches to theorizing and studying science, technology, engineering, and mathematics (STEM) learning and epistemology and synthesis of the scientific basis of learning. A major research project will focus on studying students' thinking in a particular STEM related domain.

STM 385G Topics in Program Development and Research: Seminar 3 Hours

Advanced investigations of selected topics and problems in curriculum theory, program design, and research design at one of the following levels: elementary school, secondary school, higher education, all-level.

STM 386 Curriculum History and Development in STEM Education 3 Hours

Historical development of school mathematics and science curricula in the United States in the last 150 years, and examination of current curricular trends. A summative project consisting of a research paper and a presentation will allow students to delve deeper into a topic of individual interest.

STM 390 Topics in Critical Issues in STEM Education 3 Hours

In-depth study of issues that are central to understanding and improving STEM education at one of the following levels: elementary school, secondary school, higher education, or all-level.

STM 390.1 Equity in STEM Education 3 Hours

Study of the meaning of equity in STEM education and how interpretations align with frameworks for viewing equity. Research, practice, and strategies designed to make STEM education equitable for students of diverse genders, ethnicities, linguistic and cultural backgrounds, socioeconomic status, and physical and learning abilities. History of multicultural education, mathematics, and science teaching for social justice.

STM 390.2 Research on Teaching and Teacher Development in STEM Education 3 Hours

Scholarship related to STEM teaching and how it can be used to address problems in K-12 school instruction. Research on teaching, teacher knowledge and beliefs, and teacher education and professional development; relationships among research, theory, and practice; and consideration of a variety of critical issues, including the meaning of effective instruction and evidence-based arguments about teaching, and how research on student thinking and theories of learning inform our understanding of teaching.

STM 390.3 Systemic Reform in STEM Education 3 Hours

Overview of the major efforts at systemic reform in STEM education. Development and testing of models of reform initiatives.

STM 390.4 Equitable and Inclusive Teaching in STEM Education 3 Hours

Research and apply equitable and inclusive teaching practices in STEM Education.

STM 390T Advanced Topics in STEM Education 3 Hours

Advanced investigations of selected topics and critical issues in STEM education aligned with STEM education faculty research interests. Students will typically produce a product (paper, presentation, proposal) that can be submitted to professional or funding agencies.

STM 390T.1 Science, Technology, Engineering, Art, and Mathematics Content and Methods 3 Hours

Focus on teaching of science and mathematics, as well as the arts; state standards for teacher preparation are covered.

STM 390T.2 Craft of Academic Writing 3 Hours

Develop confidence in one's scholarly voice by assessing strengths and areas for improvement. Discover the varied ways in which the scholarly voice can be shared for Science, Technology, Engineering, and Mathematics Education academic publications.

STM 695 Classroom Interactions and Project Based Instruction 6 Hours

Students are assigned to a mentor teacher classroom where they might continue as apprentice teachers the next semester. At least three hours a week of observation and teaching in the classroom, in addition to the six contact hours per week. Preparation, implementation, and assessment of inquiry- and project-based lessons, focusing on student thinking and participation, and meeting the needs of students with reading and writing difficulties, those learning in a second language, and those with behavioral and psychological issues.

STM 196, 396 STEM Education Forum 1,3 Hours

Seminar highlighting current research in STEM education.

STM 196T, 296T, 396T, 696T, 996T Directed Research in Science, Technology, Engineering and Mathematics Education 1,2,3,6,9 Hours

STM 197V, 397V Independent Study 1,3 Hours

Involves syntheses of literature, field investigations on selected topics, or other individual research topics.

STM 698 Thesis 6 Hours

STM 398R Master's Report 3 Hours

Preparation of a report to fulfill the requirement for the master's degree under the report option.

STM 398T Supervised Teaching in Science, Technology, Engineering, and Mathematics Education 3 Hours

STM 399W, 699W, 999W Dissertation 3,6,9 Hours