STM - Science, Technology, Engineering, and Mathematics Education

Science, Technology, Engineering, and Mathematics Education: STM

Lower-Division Courses

Upper-Division Courses

Graduate Courses

STM 180, 280, 380. Topics in Teaching Science, Technology, Engineering, and Mathematics.

Classroom applications of research in science, technology, engineering, and mathematics education, and related policy issues. For each semester hour of credit earned, one lecture hour a week for one semester. May be repeated for credit when the topics vary. Offered on the letter-grade basis only. Prerequisite: Graduate standing.

Topic 1: Quantitative Research Methods for STEM Educators. Restricted to students enrolled in STEM Education Master's program. 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. Offered on the letter-grade basis only.
Topic 2: Qualitative Research Methods for STEM Educators. Restricted to students enrolled in STEM Education Master's program. 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. Offered on the letter-grade basis only.

STM 385. Knowing and Learning in STEM Education.

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. Prerequisite: Graduate standing.

STM 385G. Seminar: Program Development and Research.

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. Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

STM 386. Curriculum History and Development in STEM Education.

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. Prerequisite: Graduate standing.

STM 390. Critical Issues in STEM Education.

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. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

Topic 1: Equity in STEM Education. 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.
Topic 2: Research on Teaching and Teacher Development in STEM Education. 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.
Topic 3: Systemic Reform in STEM Education. Overview of the major efforts at systemic reform in STEM education. Development and testing of models of reform initiatives.
Topic 4: Equitable and Inclusive Teaching in STEM Education. Restricted to students in the STEM Education program. Research and apply equitable and inclusive teaching practices in STEM Education. Three lecture hours per week for one semester.

STM 390T. Advanced Topics in STEM Education.

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. Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing.

STM 695. Classroom Interactions and Project Based Instruction.

Restricted to students in the UTeach Natural Sciences post-baccalaureate program. 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. Six lecture hours a week for one semester, with additional hours to be arranged. Curriculum and Instruction 665 and Science, Technology, Engineering, and Mathematics Education 695 may not both be counted. Offered on the letter-grade basis only. Prerequisite: Graduate standing; Curriculum and Instruction 365C or Science, Technology, Engineering, and Mathematics Education 385.

STM 196, 396. STEM Education Forum.

Seminar highlighting current research in STEM education. May be repeated for credit. Offered on the credit/no credit basis only. Prerequisite: Graduate standing.

STM 196T, 296T, 396T, 696T, 996T. Directed Research in Science, Technology, Engineering and Mathematics Education.

For each semester hour of credit earned, one lecture hour a week for one semester. May be repeated for credit. Prerequisite: Graduate standing.

STM 197V, 397V. Independent Study.

Involves syntheses of literature, field investigations on selected topics, or other individual research topics. For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit. Prerequisite: Graduate standing.

STM 698. Thesis.

The equivalent of three hours a week for two semesters. Offered on the credit/no credit basis only. Prerequisite: For 698A, graduate standing in science, technology, engineering, and mathematics education and consent of the graduate adviser; for 698B, Science, Technology, Engineering, and Mathematics Education 698A.

STM 398R. Master's Report.

Restricted to master's students in science, technology, engineering, and mathematics education. Preparation of a report to fulfill the requirement for the master's degree under the report option. The equivalent of three lecture hours a week for one semester. Offered on the credit/no credit basis only. Prerequisite: Graduate standing and consent of the graduate adviser.

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

Three lecture hours a week for one semester. Prerequisite: Graduate standing and appointment as a teaching assistant or assistant instructor in science, technology, engineering, and mathematics education.

STM 399W, 699W, 999W. Dissertation.

May be repeated for credit. Offered on the credit/no credit basis only. Prerequisite: Admission to candidacy for the doctoral degree.

Professional Courses