STEM Education for Early Childhood (STEM)

Courses

STEM 2103. Knowing and Learning in Science and Mathematics. 3 Hours.
This course draws on scholarship in educational psychology to provide a firm foundation for the teaching of science and mathematics by exploring what it means to know and understand in these disciplines, and how that influences instructional methods and assessment. Prerequisite: ARSC 1201 or instructor consent. (Typically offered: Fall and Spring)

STEM 2203. Classroom Interactions. 3 Hours.
This course examines the interplay between teachers, students, and content, and how such interactions enable students to develop deep conceptual understanding of science and mathematics in secondary schools. Students learn a variety of instructional strategies to engage students of diverse backgrounds, acknowledging that quality instruction should reach all learners. Prerequisite: ARSC 1201 and ARSC 1221 (Step 1 and Step 2 courses of the UTeach sequence) or instructor consent. (Typically offered: Fall)

STEM 3303. Project Based Instruction for Secondary Mathematics and Science. 3 Hours.
This teacher preparation course focuses on the integration of mathematics and science concepts in project-based lessons to model ways used by scientists, mathematicians, and engineers in addressing real world problems. Each student team will design and teach a project-based unit and evaluate its effectiveness in a secondary classroom. Prerequisite: STEM 2203 or instructor consent. (Typically offered: Fall)

STEM 4033. Introduction to STEM Education. 3 Hours.
This course provides an introduction to the foundations of STEM education disciplines and the strategies used to deliver integrative STEM education in the elementary and secondary school setting. The nature of STEM education disciplines, STEM pedagogy, teaching strategies, integrative STEM learning, STEM careers, and problem-centered instruction are addressed. (Typically offered: Spring and Summer)

STEM 4043. Creativity and Innovation in STEM Education. 3 Hours.
This course in technology and engineering education focuses on the development and introduction of technology and engineering-based activities to support science and mathematics instruction in the elementary and middle level classroom. Through hands-on, problem based learning challenges, students will develop an understanding of the design process and the integration of science, technology, engineering, and mathematics (STEM) often used to solve real-world problems. Prerequisite: STEM 4033. (Typically offered: Spring)

STEM 4104. Astronomy for Educators. 4 Hours.
Astronomy for Educators splits evenly between the basics of astronomy and practical methods for teaching astronomy effectively to all grade levels. The class is appropriate and effective for elementary, middle school, and secondary educators. Pedagogy focuses on the use of low-cost models that help all students grasp astronomy fundamentals such as phases of the Moon and how our solar system works. Lab activities include building and working with scientific models, evening lab activities give students the opportunity to use telescopes and binoculars to observe the Moon, planets, constellations and more. No prior experience or astronomy knowledge is assumed for this course. (Typically offered: Fall and Spring)

STEM 4333. History and Philosophy of Science for Science Teachers. 3 Hours.
The History and Philosophy of Science for Science Teachers explores knowledge generation in the sciences by referencing the history and philosophy of the sciences. The course prepares future teachers with the background, rationales and strategies necessary to enhance student knowledge and interest in these important foundation areas. (Typically offered: Spring)

STEM 4409. Supervised Clinical Teaching in Science and Mathematics Education. 9 Hours.
Supervised Clinical Teaching is the apprenticeship experience for UTeach students preparing for careers as mathematics and science teachers. Student interns will teach at the secondary level with mentoring provided by university supervisors and experienced classroom educators. The required seminar will address experiences, questions and problems encountered in the field. Prerequisite: ARSC 1201, ARSC 1221, STEM 2103, STEM 2203 and STEM 3303. (Typically offered: Spring)

STEM 5023. Creativity and Innovation in STEM. 3 Hours.
This introductory course in technology and engineering education (TEED) focuses on the development and introduction of TEED activities to support science and mathematics instruction in the elementary classroom. Through hands-on, problem-based learning challenges, students will develop understanding of the engineering design process and the integration of STEM often used to solve real-world problems. Prerequisite: STEM 4033 or STEM 5033 (formerly STEM 4033). (Typically offered: Fall and Summer)

STEM 5033. Introduction to STEM Education. 3 Hours.
(Formerly STEM 4033.) This course provides an introduction to the foundations of STEM education disciplines and the strategies used to deliver integrative STEM education in the elementary and secondary school setting. The nature of STEM education disciplines, STEM pedagogy, teaching strategies, integrative STEM learning, STEM careers, and problem-centered instruction are addressed. Graduate degree credit will not be given for both STEM 4033 and STEM 5033. (Typically offered: Spring and Summer)

STEM 5104. Astronomy for Educators. 4 Hours.
(Formerly STEM 4104.) Astronomy for Educators splits evenly between the basics of astronomy and practical methods for teaching astronomy effectively to all grade levels. The class is appropriate and effective for elementary, middle school, and secondary educators. Pedagogy focuses on the use of low-cost models that help all students grasp astronomy fundamentals such as phases of the Moon and how our solar system works. Lab activities include building and working with scientific models, evening lab activities give students the opportunity to use telescopes and binoculars to observe the Moon, planets, constellations and more. No prior experience or astronomy knowledge is assumed for this course. Graduate degree credit will not be given for both STEM 4104 and STEM 5104. (Typically offered: Fall and Spring)

STEM 5203. Problem-Based Mathematics. 3 Hours.
This graduate level course focuses on sharing, modeling and practicing strategies to support the meaningful integration of science, technology, engineering and mathematics (STEM) with the emphasis on mathematics in the K-4 classroom. A strong foundation for integrating the STEM disciplines through a problems-based approach within the elementary curriculum will be developed by providing students with theoretical frameworks, research, resources, and methods related to appropriate and effective classroom practice. Prerequisite: CIED 3123. (Typically offered: Irregular)
STEM 5213. Teaching Problem-Based Science in the Elementary Grades. 3 Hours.
This graduate level course focuses on sharing, modeling and practicing strategies to support the meaningful integration of science, technology, engineering and mathematics (STEM) with the emphasis on science in the K-4 classroom. A strong foundation for integrating the STEM disciplines through a problems-based approach within the elementary curriculum will be developed by providing students with theoretical frameworks, research, resources, and methods related to appropriate and effective classroom practice. Prerequisite: CIED 3143 and admission to the M.A.T. program or enrollment in the M. Ed. program. (Typically offered: Spring)