

# STEM Education (STEM)

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## Courses

### **STEM 50003. Introduction to Teaching Secondary Science. 3 Hours.**

Study of the methods and materials for teaching science. Includes philosophical, cognitive, and psychological dimensions of teaching science. The planning of instruction, microteaching, safety and liability issues, and the development of instructional materials are included. Prerequisite: Admission to Teacher Education (EDUCMA) M.A.T. program. (Typically offered: Fall)

### **STEM 50203. 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 and understanding of the engineering design process and the integration of STEM often used to solve real-world problems. Prerequisite: STEM 40303 or STEM 50303. (Typically offered: Fall and Summer)

### **STEM 50303. 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. Graduate degree credit will not be given for both STEM 40303 and STEM 50303. (Typically offered: Spring and Summer)

### **STEM 50703. Teaching Programming in the Secondary Schools. 3 Hours.**

This course provides an introduction to the foundations of teaching methods for computer programming in the secondary schools. Methods of computer programming instruction will include teaching strategies in coding, developing computational thinking, problem-solving skills, and applying key programming concepts. (Typically offered: Irregular)

### **STEM 51004. 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. Graduate degree credit will not be given for both STEM 41004 and STEM 51004. (Typically offered: Fall and Spring)

### **STEM 52003. 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 31203. (Typically offered: Irregular)

### **STEM 52103. 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: STEM 31403 and admission to either Elementary Education (ELEDMA) or Curriculum and Instruction (CIEDME) program. (Typically offered: Spring)

### **STEM 53003. Teaching Secondary Mathematics. 3 Hours.**

Study of the methods and materials in teaching middle, junior high, and high school mathematics. Philosophical, cognitive, and psychological dimensions of teaching secondary topics including, but not limited to algebra, geometry, and statistics. The planning of instruction, microteaching, and the development of instructional materials are included. Prerequisite: Admission to Teacher Education (EDUCMA) M.A.T. program. (Typically offered: Summer)

### **STEM 53103. Teaching Secondary Mathematics II. 3 Hours.**

Framed by current literature in mathematics education, teacher candidates will deepen their knowledge of effective practices for teaching mathematics, and essential elements of school mathematics programs such as access and equity, curriculum, and assessment. The course will focus on pedagogy for teaching high school mathematics content. Prerequisite: STEM 53003. (Typically offered: Spring)

### **STEM 53303. Nature of Science: Philosophy of Science for Science Educators. 3 Hours.**

The Nature of Science is a hybrid discipline drawing from philosophy, history and sociology of science and the psychology of scientific observation to provide a complete view of how science functions. This understanding is particularly important for science teachers. Prerequisite: Graduate standing. (Typically offered: Spring)