Math & Science Education (EMS)

EMS 204 Introduction to Mathematics Education (2 credit hours)
This course introduces students to the teaching of Mathematics in middle and high schools. Students will become familiar with state mathematics standards and national recommendations for teaching mathematics. The course has a required fieldwork component in local K-12 schools, and students are responsible for their own transportation to and from the schools. Students are required to purchase internship liability insurance to participate in this course. Contact University Insurance & Risk Managemnt for details on acquiring the insurance and the current charge. This course is restricted to Teacher Education majors.

Prerequisite: ED 100; Corequisite: ED 204
Typically offered in Fall and Spring

EMS 205 Introduction to Teaching Science (2 credit hours)
Introduces perspective teachers to the teaching of science in the middle school and high school. Topics include nature of the science learner, common alternative conceptions in science, introduction to science teaching strategies, and the science curriculum in middle and high school. Sophomore status or higher is required. Sophomore status or higher is required.

Prerequisite: Sophomore standing; Corequisite: ED 204
Typically offered in Spring only

EMS 296 Special Topics in Education (1-3 credit hours)
Individual or group study of particular areas of education at the freshman and sophomore levels. Specific topics will vary from semester to semester.

EMS 373 Instructional Materials in Science (3 credit hours)
Development and selection of teaching materials that reflect concepts of content and emphasis in middle and secondary school science.

Prerequisite or Corequisite: EMS 205 and ED 204
Typically offered in Fall only

EMS 375 Methods of Teaching Science I (3 credit hours)
Classroom, laboratory, and internship experiences for pre-service teachers to effectively prepare, plan and assess learning environments in the middle and secondary science classroom and instructional laboratory. Emphasis placed on knowledge, skills, and dispositions for inquire-based learning environments.

Prerequisite: EMS 205, ED 204
Typically offered in Spring only

EMS 450/EMS 550 Teaching Environmental Education (3 credit hours)
This course is designed to provide disciplinary and interdisciplinary overviews of environmental education. Students will learn a range of research-supported practices in environmental education that are effective for youth and adults. Topics include a variety of methods for teaching and assessing environmental education.

GEP Interdisciplinary Perspectives
Typically offered in Fall only

EMS 470/EMS 570 Methods and Materials for Teaching Mathematics (3 credit hours)
Purposes, methods, curricula, and evaluation practices for teaching mathematics in middle and high school levels.

Prerequisite: C or better in EMS 480 and EMS 472 or EMS 474 and admittance to Teacher Candidacy.
Typically offered in Fall only

EMS 471 Student Teaching in Mathematics (1-12 credit hours)
Supervised experience in a selected middle or secondary school for the semester, to develop and practice the skills and techniques for teaching mathematics. Students are required to provide their own transportation. MED, MSM and MSD majors only.

Prerequisite: Admission to professional semester, Completion of EMS 470 with a C or better; Corequisite: EMS 495
Typically offered in Spring only

EMS 472/EMS 572 Teaching Mathematics Topics in Senior High School (3 credit hours)
Preparation for teaching mathematics in grades 9-12. This course includes a school-based field experience. Students are required to provide their own transportation. MED Majors only.

Prerequisite: Admittance to Teacher Candidacy
Typically offered in Spring only

EMS 474 Teaching Mathematics Topics in the Middle Grades (3 credit hours)
Methods of teaching arithmetic, geometry, algebra, and pre-algebra topics in grades 6-9. Emphasizes approaches that actively involve learners and relate operations on concrete and pictorial representations to mathematical symbols. This course includes a school-based field experience. Students are required to provide their own transportation. MSM Majors only.

Prerequisite: Admittance to Teacher Candidacy
Typically offered in Spring only

EMS 475 Methods of Teaching Science II (3 credit hours)
Goals, methods, curricula, and evaluation practices in teaching the physical and biological sciences at the middle and secondary school levels.Taught during the fall.

Prerequisite: EMS 375
Typically offered in Fall only

EMS 476 Student Teaching in Science (1-12 credit hours)
Supervised experience in a selected middle or secondary school for the semester, to develop and practice the skills and techniques for teaching Science. Students are required to provide their own transportation. SED and MSS majors only. Students are required to purchase internships liability insurance to participate in student teaching. Contact University Insurance & Risk Management for details on acquiring the insurance and the current charge.

Prerequisite: EMS 475; and Corequisite: EMS 495
Typically offered in Fall and Spring

EMS 480/EMS 580 Teaching Mathematics with Technology (3 credit hours)
Prepares prospective mathematics teachers to use technology in their classrooms to assist students in formulating and solving math problems in the middle and high school mathematics curricula.

Prerequisite: EMS 204 with a B- or better; MA 131 or 141
Typically offered in Spring and Summer

EMS 490 School Mathematics from an Advanced Perspective (3 credit hours)
This course will serve as a culminating experience for all students majoring in mathematics education and intending to become mathematics teachers. Course content includes functions in both secondary and collegiate mathematics, development of euclidean geometry from Euclid's elements, and historical overview of algebra, a trigonometry review from both triangle basis and function basis, connections between linear algebra and the high school presentation of matrices, and other topics.

Prerequisite: Junior or Senior Standing in Mathematics Education and C or better in (EMS 472 or EMS 474)
Typically offered in Fall only

EMS 495 Senior Seminar in Mathematics and Science Education (1-3 credit hours)
In-depth investigation of one or more teaching areas in mathematics or science education.

Prerequisite: Advanced Undergraduate standing
Typically offered in Spring only

EMS 496 Special Topics in Education (1-3 credit hours)
Individual or group study of special topics in professional education. The topic and mode of study are determined by the faculty member after discussion with the student.

Prerequisite: Junior or senior standing

EMS 505 Methods of Teaching Science I (3 credit hours)
Graduate students new to science teaching will read current research literature that defines best practices and incorporate these practices to lesson planning that enhances student learning. Classroom, laboratory, and school-based experiences in middle and secondary science classrooms and instructional laboratories will help students to effectively prepare, plan, and assess learning environments. Emphasis placed on the development of knowledge, skills, and dispositions for inquiry-based learning environments. Underlying theoretical framework is constructivism, and experiences will be discussed using current learning theory. PBS or Graduate Standing.

Typically offered in Spring only

EMS 506 Methods of Teaching Science II (3 credit hours)
This course is designed to provide graduate-level pre-service teachers with meaningful and practical learning experiences that will prepare them to create effective science learning environments for secondary school age students and to construct a vision of themselves as a teacher of secondary science. In the course, pre-service teachers will have opportunities to apply research-supported best practices to planning and enacting science lessons and to critically analyze current trends, issues and problems in science education.

Typically offered in Fall only

EMS 510 Interactions In the Mathematics Classroom (3 credit hours)
This course focuses on interactions between students and teachers in the mathematics classroom. Topics studied will include: whole class instruction, small group activity, questioning and facilitating classroom discussion. This course will include a field experience in the schools for which students will be required to provide their own transportation. Course restricted to graduate students in the MED, MS or MAT programs.

Prerequisite: Graduate standing in STEM Education
Typically offered in Spring only
This course is offered alternate odd years

EMS 512 Teaching and Learning Elementary and Middle Grades Mathematics (3 credit hours)
Focus on theory, research, and methodology of teaching and learning mathematics in elementary and middle grades. Emphasizes the development of a foundation for understanding and assessing mathematical growth and learning through historical and psychological sources, research, and reflective practice. Emphasis is placed upon understanding how children come to learn elementary mathematics meaningfully and what this necessarily implies about the way mathematics is taught and how elementary and middle grades education can be improved.

Prerequisite: Graduate standing in STEM Education
Typically offered in Fall only

EMS 513 Teaching and Learning of Algebraic Thinking (3 credit hours)
Teaching and learning of algebra from a developmental perspective; research-based methods for developing students' algebraic thinking; structure and processes used in algebra. Focus on how students develop algebraic ideas from upper elementary grades through Algebra I.

Prerequisite: Graduate standing in STEM Education
Typically offered in Fall only
This course is offered alternate odd years

EMS 514 Teaching and Learning of Geometric Thinking (3 credit hours)
Focus will be on the development of geometric thinking in grades K-12 using multiple instructional approaches, including technology, and considered using different theories of learning and frameworks (e.g., Van Hiele, SOLO taxonomy). Topics may include: measurement, similarity, congruence, properties of 2 and 3 dimensional figures, circles, non-Euclidean geometries. Synthetic, analytic and transformational, formal and informal approaches will be highlighted.

Prerequisite: Graduate standing in STEM Education
Typically offered in Fall only
This course is offered alternate even years

EMS 519/ST 519 Teaching and Learning of Statistical Thinking (3 credit hours)
This course is designed to bridge theory and practice on how students develop understandings of key concepts in data analysis, statistics, and probability. Discussion of students' understandings, teaching strategies and the use of manipulatives and technology tools. Topics include distribution, measures of center and spread, sampling, sampling distribution, randomness, and law of large numbers. Must complete a first level graduate statistics course (ST 507, ST 511, or equivalent) before enrolling.

Prerequisite: ST 507 or ST 511
Typically offered in Spring only
This course is offered alternate even years

EMS 521 Advanced Methods in Science Education I (3 credit hours)
Contemporary learning theories and current research will guide students to create effective science learning environments for all students. Students will engage in critical analysis of current trends, issues and problems in science education in terms of multiple perspectives. Students will also have opportunities to contemplate what it means to teach science, what it means to teach a diverse population of students and how to develop, interpret, and implement alternative assessment.

Prerequisite: Graduate standing in Science Education
Typically offered in Fall only
This course is offered alternate odd years

EMS 522 Advanced Methods in Science Education II (3 credit hours)
Examines science instruction through analysis of curricula, instructional practices, current research on science learning and teaching. Five areas of interest: curriculum, instruction, assessment, diversity, learning environments and technology in science education.

Prerequisite: Graduate standing in Science Education
Typically offered in Fall only
This course is offered alternate even years

EMS 531 Introduction to Research in Science Education (3 credit hours)
Introduction to science education research, within two focal areas. One focus is to learn to read, understand, evaluate, and apply published educational research in your own practice, with scaffolding to support your understanding of techniques and designs specific to and/or in the context of science education research. Another focus is to learn to conduct research in order to improve your effectiveness as an educator or solve educational problems. You will learn about ethics connected with research and will perform and interpret quantitative and/or qualitative analyses commonly used in science education research while carrying out a research project that you designed. You will learn about how research papers are structured and organized, and communicate your research findings in both oral and written form.

Prerequisite: Graduate standing in Science Education
Typically offered in Spring only
This course is offered alternate odd years

EMS 550/EMS 450 Teaching Environmental Education (3 credit hours)
This course is designed to provide disciplinary and interdisciplinary overviews of environmental education. Students will learn a range of research-supported practices in environmental education that are effective for youth and adults. Topics include a variety of methods for teaching and assessing environmental education.

GEP Interdisciplinary Perspectives
Typically offered in Fall only

EMS 551 Learning in Informal Contexts: Theory to Practice (3 credit hours)
In this course, students will examine the theory, research, and practice of learning in informal contexts. The main focus of coursework will involve collaborative projects working with community partners who offer informal learning programs, including museums, zoos, aquaria, or other relevant organizations.

P: Graduate Standing
Typically offered in Spring only

EMS 552 Learning in Informal Contexts: Evaluation (3 credit hours)
In this course, we will seek an answer to the question: How do we know if learning has occurred in informal contexts? To answer this question, we will examine processes and strategies used to evaluate learning specific to the special circumstances found in informal contexts. The main focus of the coursework will involve collaborative community-engaged projects working with partners who offer informal learning programs. Throughout the course, we will employ best practices of community-engaged scholarship in a semester-long project conducted with community partners. We will also meet the five domains of evaluator competencies, as defined by the American Evaluation Association.

P: Graduate Standing
Typically offered in Fall only

EMS 570/EMS 470 Methods and Materials for Teaching Mathematics (3 credit hours)
Purposes, methods, curricula, and evaluation practices for teaching mathematics in middle and high school levels.

Prerequisite: C or better in EMS 480 and EMS 472 or EMS 474 and admittance to Teacher Candidacy.
Typically offered in Fall only

EMS 572/EMS 472 Teaching Mathematics Topics in Senior High School (3 credit hours)
Preparation for teaching mathematics in grades 9-12. This course includes a school-based field experience. Students are required to provide their own transportation. MED Majors only.

Prerequisite: Admittance to Teacher Candidacy
Typically offered in Spring only

EMS 573 Design of Tools and Learning Environments in STEM Education (3 credit hours)
The course aims to develop: familiarity with research related to the teaching and learning of STEM content within technological learning environments, advanced knowledge of the ways technology can support teaching and learning in STEM, and the ability to design technology-enabled learning experiences. Course activities are designed to enhance understandings and applications of technological tools within and across STEM disciplines.

Prerequisite: Graduate standing in STEM Education
Typically offered in Fall and Spring

EMS 575 Foundations Of Science Education (3 credit hours)
Study and analysis of philosophical, historical, sociological, political and economic factors affecting science education in schools of the U.S. Implications for science education of various learning theories along with models for curriculum development and program planning.

Prerequisite: Graduate standing in Science Education
Typically offered in Spring only
This course is offered alternate years

EMS 577 Improving Classroom Instruction In Science (3 credit hours)
Application of major principles of education and psychology to improvement of science teaching in elementary, middle and secondary schools. Emphasis on critical analysis of research and the development of research-based classroom applications. Goals and objectives of science teaching, instructional strategies, development or selection of science materials, evaluation of achievement and elements of a desirable classroom climate.

Prerequisite: EMS 475
Typically offered in Spring only
This course is offered alternate years

EMS 580/EMS 480 Teaching Mathematics with Technology (3 credit hours)
Prepares prospective mathematics teachers to use technology in their classrooms to assist students in formulating and solving math problems in the middle and high school mathematics curricula.

Prerequisite: EMS 204 with a B- or better; MA 131 or 141
Typically offered in Spring and Summer

EMS 581 Advanced Applications of Technology in Mathematics Education (3 credit hours)
Research-based applications of technology tools in secondary and middle school mathematics. Advanced use of various technology tools for learning and teaching mathematics, including design of technology environments, appropriate investigation tasks, and professional development.

Typically offered in Spring only

EMS 592 Special Problems In Mathematics Teaching (1-6 credit hours)
In-depth investigation of topical problems in mathematics teaching chosen from areas of curriculum, methodology, technology, supervision and research.

Prerequisite: EMS 471
Typically offered in Fall, Spring, and Summer

EMS 594 Special Problems In Science Teaching (1-3 credit hours)
In-depth investigation of topics in science education not covered in existing courses. Includes critical analysis of research and may include field work. May be offered on an individual basis or as a class.

P: Graduate Standing
Typically offered in Fall, Spring, and Summer

EMS 621 Special Problems In Mathematics Teaching (1-6 credit hours)
In-depth investigation of topical problems in mathematics teaching chosen from areas of curriculum, methodology, technology, supervision and research.

Prerequisite: EMS 471
Typically offered in Summer only

EMS 622 Special Problems In Science Teaching (1-6 credit hours)
In-depth investigation of topics in science education not covered in existing courses. Includes critical analysis of research and may include field work. May be offered on individual basis or as a class.

Prerequisite: EMS 476
Typically offered in Fall, Spring, and Summer

EMS 630 Independent Study in EMS (1-3 credit hours)
Detailed investigation of topics of particular interest to graduate students under faculty direction on a tutorial basis. Determination of credits and content by faculty members in consultation with department head.

Typically offered in Fall and Spring

EMS 641 Practicum In Science and Mathematics Education (1-6 credit hours)
Supervised practicum in appropriate settings both on- and off-campus. Provision for opportunity for development, implementation and evaluation in a science and mathematics in clinical environment under faculty supervision.

Prerequisite: EMS 770 or EMS 775
Typically offered in Fall and Spring

EMS 651 Internship In Mathematics And Science Education (1-9 credit hours)
Utilizing the participant-observer role, required participation in selected educational situations with emphasis upon development of observational skills, ability to record relevant observations by means of written journals, skills in analyzing experiences identifying critical incidents and projection of events and consequences. Students required to develop possible alternative courses of action in various situations, select one of the alternatives and evaluate consequences of the selected course of action.

Prerequisite: Nine hrs. in grad. level courses
Typically offered in Fall, Spring, and Summer

EMS 675 Portfolio Development (1 credit hours)
Techniques of portfolio construction for documenting attainment of advanced competencies in science training.For students in the last or next to last semester of coursework in the Science Education Masters Program.

Typically offered in Fall only

EMS 685 Master's Supervised Teaching (1-3 credit hours)
Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment.

Prerequisite: Master's student
Typically offered in Fall and Spring

EMS 686 Teaching In College (3 credit hours)
Focus on development of competencies to perform fundamental tasks of a college teacher as well as consideration of more long-range tasks such as course development and university responsibilities of a professor. In addition to attending lectures and other types of presentations, students make video tapes of their teaching, develop tests, design introductory courses in their teaching fields and consider current issues related to university and college teaching.

Typically offered in Summer only

EMS 688 Non-Thesis Masters Continuous Registration - Half Time Registration (1 credit hours)
For students in non-thesis master's programs who have completed all credit hour requirements for their degree but need to maintain half-time continuous registration to complete incomplete grades, projects, final master's exam, etc.

Prerequisite: Master's student
Typically offered in Fall, Spring, and Summer

EMS 689 Non-Thesis Master Continuous Registration - Full Time Registration (3 credit hours)
For students in non-thesis master's programs who have completed all credit hour requirements for their degree but need to maintain full-time continuous registration to complete incomplete grades, projects, final master's exam, etc. Students may register for this course for a maximum of one semester.

Prerequisite: Master's student
Typically offered in Summer only

EMS 690 Master's Examination (1-9 credit hours)
For students in non thesis master's programs who have completed all other requirements of the degree except preparing for and taking the final master's exam.

Prerequisite: Master's student
Typically offered in Spring only

EMS 692 Research Projects In Mathematics and Science Education (1-3 credit hours)
A project or problem in research in education for graduate students, supervised by members of the graduate faculty. The research chosen on the basis of individual students' interests and not to be part of thesis or dissertation research.

Typically offered in Fall, Spring, and Summer

EMS 693 Master's Supervised Research (1-9 credit hours)
Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Master's student
Typically offered in Fall, Spring, and Summer

EMS 695 Master's Thesis Research (1-9 credit hours)
Thesis research.

Prerequisite: Master's student
Typically offered in Fall, Spring, and Summer

EMS 696 Summer Thesis Research (1 credit hours)
For graduate students whose programs of work specify no formal coursework during a summer session and who will be devoting full time to thesis research.

Prerequisite: Master's student
Typically offered in Summer only

EMS 699/EOE 699/EAC 699/ECD 699/ECI 699/ELP 699 Master's Thesis Preparation (1-9 credit hours)
For students who have completed all credit hour requirements and full-time enrollment for the master's degree and are writing and defending their theses.

Prerequisite: Master's student
Typically offered in Spring and Summer

EMS 703 Teaching Mathematics and Science In Higher Education (3 credit hours)
Examination of collegiate mathematics and science instruction with respect to goals and objectives, design of courses and curricula, innovative programs and facilities, and methods and materials for instruction.

Prerequisite: EMS 770, 621 or 622, Graduate standing
Typically offered in Spring only

EMS 704 Curriculum Development and Evaluation In Science and Mathematics (3 credit hours)
Critical study of elements of curriculum design and theory in mathematics education and science education and examination of evaluation procedures for assessing educational innovations.

Prerequisite: Doctoral standing in Mathematics and Statistics Education
Typically offered in Spring only
This course is offered alternate years

EMS 705 Education and Supervision Of Teachers Of Mathematics and Science (3 credit hours)
Critical analysis of theories, programs and techniques designed to promote interpersonal interactions leading to more effective teaching of science and mathematics.

Prerequisite: Doctoral standing in Mathematics and Statistics Education
Typically offered in Spring only
This course is offered alternate years

EMS 711 Research on the Teaching and Learning of Math at Secondary and Early College Levels (3 credit hours)
This course familiarizes students with theories and research related to mathematical thinking, learning and teaching at the secondary and early college levels with a focus on the following topics: function, expressions and equations, geometry, proof, limit, calculus, differential equations, and linear algebra. Students will apply theories to analyze secondary and freshmen/sophomore standing mathematical thinking, synthesize research findings, explain difficulties students experience, and design and conduct research. Restriction: at least 18 hrs of 400-500 level mathematics and a PhD student in Mathematics Education.

Typically offered in Spring only

EMS 712 Teaching Mathematics In Elementary and Junior High School (3 credit hours)
Comprehensive study of teaching mathematics in elementary and junior high schools. Major emphasis on building skills in teaching arithmetic, elementary algebra and intuitive geometry. Thorough search of literature relative to mathematics curricula conducted, designing and sequencing of learning activities, teaching mathematical concepts and relationships, building skill in computation, reading mathematics, problem solving and measurement.

Restriction: Doctoral Standing in Mathematics and Statistics Education
Typically offered in Spring and Summer
This course is offered alternate years

EMS 730 Trends and Issues in Science Education (3 credit hours)
Provides an in-depth examination and analysis of literature and research in science education as well as current trends in science education reform. Emphasis is placed on the analysis of theoretical models of inquiry. Course includes the development of a review of literature and the formation of research questions specific to science education.

Prerequisite: Graduate standing
Typically offered in Fall only
This course is offered alternate even years

EMS 731 Fundamentals of Research in Science Education: Qualitative and Quantitative Inquiry (3 credit hours)
Students will develop an understanding of different science education research designs, practical issues and trade-offs of each research design, and epistemological frameworks of different types of science education inquiry. The history of science education research is examined as a means to orient students to the trends that have taken place in science education.

Prerequisite: Graduate standing in Learning and Teaching in STEM: Science Education and ST 507 or 511, Corequisite: ST 508 or 512
Typically offered in Spring only
This course is offered alternate odd years

EMS 732 Theoretical and Critical Perspectives of Science Education (3 credit hours)
Examines current theoretical and critical perspectives of science education. Examines a variety of approaches which re-assess cultural notions of meaning, identity, power, and representation in the sciences and science education. Applies research theory to reform in science education.

Prerequisite: Graduate standing
Typically offered in Fall only

EMS 770 Foundations Of Mathematics Education (3 credit hours)
The current status of mathematics education with special emphasis on study and critical analysis of current practices in mathematics instruction from elementary school through college.

Prerequisite: Doctoral standing in Mathematics and Statistics Education
Typically offered in Spring only

EMS 775 Foundations Of Science Education (3 credit hours)
Study and analysis of philosophical, historical, sociological, political and economic factors affecting science education in schools of the U.S. Implications for science education of various learning theories along with models for curriculum development and program planning. Critical analysis of current trends, issues and problems in science education in terms of multiple perspectives.

Prerequisite: Graduate Standing in Learning and Teaching in STEM: Science Education
Typically offered in Fall only
This course is offered alternate years

EMS 777 Improving Classroom Instruction In Science (3 credit hours)
Application of major principles of education and psychology to improvement of science teaching in elementary, middle and secondary schools. Emphasis on critical analysis of research and the development of research-based classroom applications. Goals and objectives of science teaching, instructional strategies, development or selection of science materials, evaluation of achievement and elements of a desirable classroom climate.

Prerequisite: EMS 475
Typically offered in Spring only
This course is offered alternate years

EMS 780 Foundational Learning Theories in STEM Education (3 credit hours)
This course is an introduction to the field of learning sciences related to STEM education. Students examine the learning theories as they relate to STEM disciplines and apply the theories to the design of research. Applications of learning theory to STEM education reform will be discussed.

Restriction: Doctoral Standing in Learning and Teaching in STEM
Typically offered in Spring only

EMS 786/EAC 786 Teaching in College (3 credit hours)
Focus on development of competencies to perform fundamental tasks of a college teacher as well as consideration of more long-range tasks such as course development and university responsibilities of a professor. In addition to attending lectures andother types of presentations, students make video tapes of their teaching, develop tests, design introductory courses in their teaching fields and consider current issues related to university and college teaching.

Typically offered in Fall and Summer

EMS 791 Contemporary Research and Critical Issues in STEM Education (3 credit hours)
This course is designed to provide disciplinary and interdisciplinary overviews of STEM issues and trends that will help graduate students construct their own theoretical foundations and practical understanding of STEM education. In the course, students will discuss a wide range of current issues, movements, and research-supported practices in STEM education not only in K-16 classrooms but also informal education settings. Students will also have opportunities to conceptualize their own framework for quality STEM education connecting research and practice in the field. A main course activity will be reading, analysis, and discussion of selected readings in each topic area. Students will share the responsibility of guiding class discussions, write up reflection and conceptualization, and conduct individual projects that relate directly to the main topics explored in the course.

Prerequisites: Doctoral Standing in Learning and Teaching in STEM
Typically offered in Fall only

EMS 792 Special Problems in Math Teaching (3-6 credit hours)
In-depth investigation of topical problems in mathematics teaching chosen from areas of curriculum, methodology, technology, supervision and research.

Typically offered in Fall, Spring, and Summer

EMS 794 Special Problems in Science Teaching (3-6 credit hours)
In-depth investigation of topics in science education not covered in existing courses. Includes critical analysis of research and may include field work. May be offered on an individual basis or as a class.

Prerequisite: EMS 476
Typically offered in Fall, Spring, and Summer

EMS 802 Seminar In Mathematics Education (1-12 credit hours)
In-depth examination and analysis of literature and research in a particular topic(s) in mathematics education.

Prerequisite: Departmental Majors
Typically offered in Fall and Spring

EMS 803 Seminar In Science Education (2 credit hours)
In-depth examination and analysis of literature and research in a particular topic(s) in science education.

Prerequisite: Department Majors
Typically offered in Fall and Spring

EMS 821 Special Problems In Mathematics Teaching (1-6 credit hours)
In-depth investigation of topical problems in mathematics teaching chosen from areas of curriculum, methodology, technology, supervision and research.

Prerequisite: EMS 471
Typically offered in Summer only

EMS 822 Special Problems In Science Teaching (1-6 credit hours)
In-depth investigation of topics in science education not covered in existing courses. Includes critical analysis of research and may include field work. May be offered on individual basis or as a class.

Prerequisites: Doctoral Standing in Learning and Teaching in STEM
Typically offered in Fall and Spring

EMS 832 Research Applications in Science Education (3 credit hours)
Provides students with the opportunity to design science education research including formulating research questions, designing the methodologies to be used in the study, selecting assessments and protocols, and identifying appropriate analyses. Theoretical frameworks and associated assumptions are identified and critiqued. Develop advanced skills in reviewing different types of science education research and identifying issues of validity and reliability.

Prerequisite: Graduate Standing in Learning and Teaching in STEM: Science Education. EMS 732, ST 507/ED 710 and ED 730
Typically offered in Spring only

EMS 841 Practicum In Science and Mathematics Education (1-6 credit hours)
Supervised practicum in appropriate settings both on- and off-campus. Provision for opportunity for development, implementation and evaluation in science and mathematics in clinical environment under faculty supervision.

Prerequisite: EMS 770 or EMS 775
Typically offered in Fall, Spring, and Summer

EMS 851 Internship In Mathematics and Science Education (1-9 credit hours)
Utilizing the participant-observer role, required participation in selected educational situations with emphasis upon development of observational skills, ability to record relevant observations by means of written journals, skills in analyzing experiences identifying critical incidents and projection of events and consequences. Student required to develop possible alternative courses of action in various situations, select one of the alternatives and evaluate consequences of selected course of action.

Typically offered in Fall, Spring, and Summer

EMS 885 Doctoral Supervised Teaching (1-3 credit hours)
Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment.

Prerequisite: Doctoral student
Typically offered in Fall and Spring

EMS 890 Doctoral Preliminary Exam (1-9 credit hours)
For students who are preparing for and taking written and/or oral preliminary exams.

Prerequisite: Doctoral student
Typically offered in Fall, Spring, and Summer

EMS 892 Research Projects In Mathematics and Science Education (1-3 credit hours)
A project or problem in research in education for graduate students, supervised by members of the graduate faculty. The research chosen on the basis of individual students' interests and not to be part of thesis or dissertation research.

Typically offered in Fall, Spring, and Summer

EMS 893 Doctoral Supervised Research (1-9 credit hours)
Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Doctoral student
Typically offered in Fall, Spring, and Summer

EMS 895 Doctoral Dissertation Research (1-9 credit hours)
Dissertation research.

Prerequisite: Doctoral student
Typically offered in Fall, Spring, and Summer

EMS 896 Summer Dissertation Research (1 credit hours)
For graduate students whose programs of work specify no formal coursework during a summer session and who will be devoting full time to thesis research.

Prerequisite: Doctoral student
Typically offered in Summer only

EMS 899 Doctoral Dissertation Preparation (1-9 credit hours)
For students who have completed all credit hour, full-time enrollment, preliminary examination, and residency requirements for the doctoral degree, and are writing and defending their dissertations.

Prerequisite: Doctoral student
Typically offered in Fall, Spring, and Summer