

SCIENCE & MATHEMATICS EDUC (SED)

SED 401. RESEARCH. (1-16 Credits)

This course is repeatable for 16 credits.

SED 405. READING AND CONFERENCE. (1-16 Credits)

This course is repeatable for 16 credits.

SED 406. PROJECTS. (1-16 Credits)

This course is repeatable for 16 credits.

SED 407. SEMINAR. (1-16 Credits)

This course is repeatable for 16 credits.

SED 409. FIELD PRACTICUM: SCIENCE AND MATHEMATICS. (3 Credits)

Placement in middle or high school (grades 7-12) to assist in developing competencies with adolescents in science/mathematics classes.

This course is repeatable for 18 credits.

SED 412. TECHNOLOGY FOUNDATIONS FOR TEACHING MATH AND SCIENCE. (3 Credits)

Integration of instructional technologies with other strategies to teach math and science in elementary, middle, and secondary schools in the 21st century.

Equivalent to: SED 412H

SED 413. INQUIRY IN SCIENCE AND SCIENCE EDUCATION. (3 Credits)

Investigation of inquiry and the nature of inquiry in science as it relates to science education. Students will examine issues relating to integrating scientific understandings and practice into K-12 instruction.

SED 414. INQUIRY IN MATHEMATICS AND MATHEMATICS EDUCATION. (3 Credits)

Investigation of mathematics as it relates to mathematics education. Students will examine issues related to integrating mathematical understanding, mathematics standards/curricula, and mathematics-specific strategies in K-12 instruction. Lec/lab.

SED 416. INQUIRY IN SCIENCE AND MATHEMATICS EDUCATION. (3 Credits)

Investigation of inquiry and the nature of inquiry in mathematics and science as it relates to education. Students will examine issue relating to integrating mathematical and scientific understandings and practices into K-12 education.

SED 419. TEACHING MATHEMATICAL MODELING IN STEM. (3 Credits)

Provides students an overview of the content requirements in the Common Core Standards for Mathematics and the teaching practices that are central to those standards with a focus on the role of mathematical modeling. Students experience content lessons and lessons focused on supporting students in developing understanding of that content.

Recommended: Background in an educational setting or as a pre-service teacher at any level, a K-12 teacher or free-choice learning educator

SED 431. OVERVIEW OF FREE-CHOICE LEARNING. (3 Credits)

Examines learning that occurs when people believe they have choices over what and how they learn, how much time they spend learning, and what their sources of information are. Covers current research on learning in museums, aquariums, zoos, botanical gardens, science centers, after-school programs, media and apprenticeships.

SED 435. COMMUNICATING OCEAN SCIENCES TO INFORMAL AUDIENCES. (3 Credits)

For students interested in improving their ability to communicate their scientific knowledge by helping general public and student audiences learn about ocean sciences in a wide variety of learning settings. Combines instruction in inquiry-based teaching methods and learning theory with work in student's local informal learning settings like museums, zoos, aquariums and libraries.

SED 459. SCIENCE AND THE NATURE OF INQUIRY. (3 Credits)

Focuses on inquiry approaches to the teaching and learning of science. Development of teaching strategies including materials and resources for teaching science using an inquiry approach as well as more teacher-directed approaches.

SED 473. SCIENCE PEDAGOGY AND TECHNOLOGY I. (4 Credits)

Development of pedagogical content knowledge in grades 6-12 science instruction: learning theory, nature of science, technology integration, and reform recommendations. Lec/lab/rec.

SED 474. MATHEMATICS PEDAGOGY AND TECHNOLOGY I. (4 Credits)

Development of pedagogical content knowledge in grades 6-12 mathematics instruction: learning theory, nature of mathematics, technology integration, and reform recommendations.

Recommended: Investigation of mathematics as it relates to mathematics education and SED 414

SED 476. MATHEMATICS PEDAGOGY AND TECHNOLOGY II. (4 Credits)

Development of additional pedagogical content knowledge in grades 6-12; stress on dominant themes of the school mathematics curriculum including problem solving, reasoning, communication, and connections as well as the integration of technology into the mathematics classroom.

Prerequisites: SED 474 with D- or better

SED 477. SCIENCE PEDAGOGY AND TECHNOLOGY II. (4 Credits)

Development of pedagogical content knowledge in grades 6-12; science instruction; learning theory, nature of science, technology integration, and reform recommendations.

Prerequisites: SED 473 with C or better

SED 499. SPECIAL TOPICS. (3 Credits)

PREREQ: Provisional acceptance to Education Double Degree program.
This course is repeatable for 18 credits.

SED 501. RESEARCH. (1-16 Credits)

This course is repeatable for 16 credits.

SED 503. THESIS. (1-16 Credits)

This course is repeatable for 999 credits.

SED 505. READING AND CONFERENCE. (1-16 Credits)

This course is repeatable for 16 credits.

SED 506. PROJECTS. (1-16 Credits)

This course is repeatable for 16 credits.

SED 507. SEMINAR. (1-16 Credits)

This course is repeatable for 16 credits.

SED 508. WORKSHOP. (1-16 Credits)

This course is repeatable for 16 credits.

SED 509. PRACTICUM. (1-16 Credits)

This course is repeatable for 16 credits.

SED 510. PROFESSIONAL INTERNSHIP: SCIENCE OR MATHEMATICS EDUCATION. (1-16 Credits)

Supervised teaching experience at the elementary, middle or high school level; students experience general classroom and professional responsibilities common to the regular science or mathematics teacher. *This course is repeatable for 16 credits.*

SED 511. ANALYSIS OF CLASSROOMS I. (3 Credits)

Observation and analysis of the complex science/ mathematics classroom (grades 3-12) and school culture and their impact on student learning.

SED 512. TECHNOLOGY FOUNDATIONS FOR TEACHING MATH AND SCIENCE. (3 Credits)

Integration of instructional technologies with other strategies to teach math and science in elementary, middle, and secondary schools in the 21st century.

SED 513. INQUIRY IN SCIENCE AND SCIENCE EDUCATION. (3 Credits)

Investigation of inquiry and the nature of inquiry in science as it relates to science education. Students will examine issues relating to integrating scientific understandings and practice into K-12 instruction.

SED 514. INQUIRY IN MATHEMATICS AND MATHEMATICS EDUCATION. (3 Credits)

Investigation of mathematics as it relates to mathematics education. Students will examine issues related to integrating mathematical understanding, mathematics standards/curricula, and mathematics-specific strategies in K-12 instruction. Lec/lab.

SED 516. INQUIRY IN SCIENCE AND MATHEMATICS EDUCATION. (3 Credits)

Investigation of inquiry and the nature of inquiry in mathematics and science as it relates to education. Students will examine issue relating to integrating mathematical and scientific understandings and practices into K-12 education.

SED 519. TEACHING MATHEMATICAL MODELING IN STEM. (3 Credits)

Provides students an overview of the content requirements in the Common Core Standards for Mathematics and the teaching practices that are central to those standards with a focus on the role of mathematical modeling. Students experience content lessons and lessons focused on supporting students in developing understanding of that content.

Recommended: Background in an educational setting or as a pre-service teacher at any level, a K-12 teacher or free-choice learning educator

SED 520. TECHNOLOGY FOR MATH AND SCIENCE EDUCATION. (3 Credits)

Explore current and emerging technologies applied to math and science learning that promote critical thinking, communication, collaboration, and creativity. Gain technology skills and resources that can be transferred to formal and informal learning environments.

Recommended: Basic computer literacy.

SED 531. OVERVIEW OF FREE-CHOICE LEARNING. (3 Credits)

Examines learning that occurs when people believe they have choices over what and how they learn, how much time they spend learning, and what their sources of information are. Covers current research on learning in museums, aquariums, zoos, botanical gardens, science centers, after-school programs, media and apprenticeships.

SED 535. COMMUNICATING OCEAN SCIENCES TO INFORMAL AUDIENCES. (3 Credits)

For students interested in improving their ability to communicate their scientific knowledge by helping general public and student audiences learn about ocean sciences in a wide variety of learning settings. Combines instruction in inquiry-based teaching methods and learning theory with work in student's local informal learning settings like museums, zoos, aquariums and libraries.

SED 541. WEATHER CONCEPTS FOR SCIENCE AND MATH TEACHING. (3 Credits)

Science content and pedagogy in learning and teaching basic weather concepts.

Recommended: Background in an educational setting or as a K-12 teacher or free-choice learning educator

SED 550. HIGH QUALITY SCIENCE AND MATHEMATICS INSTRUCTION. (3 Credits)

Explores high quality science and mathematics instruction to prepare professional teachers in science and mathematics. Develops skills in high-leverage instructional practices and reviews research literature that supports these practices. Investigates social justice issues related to systems of schooling in the United States.

SED 552. MATHEMATICS METHODS: PRACTICUM I. (3 Credits)

Theoretical background, practical knowledge, and skills for teaching in mathematics classrooms (grades 3-12). Instructional methods/modes, classroom management, contemporary curriculum goals and instructional planning.

SED 553. SCIENCE METHODS/PRACTICUM I. (3 Credits)

Theoretical background, practical knowledge, and skills for teaching in science classrooms (grades 3-12). Instructional methods/modes, classroom management, contemporary curriculum goals and instructional planning.

SED 564. ENGINEERING AND SCIENCE IN THE LIVES OF STUDENTS. (3 Credits)

Explore the use of construction engineering as a vehicle to make science and math more relevant and useful for the everyday life of students.

Recommended: Background in an educational setting or as a K-12 teacher or free-choice learning educator (eg. museum, science camp)

SED 566. FOSTERING REFLECTIVE DISCOURSE IN SCIENCE AND MATH CONTEXTS. (3 Credits)

Examines ways of speaking that foster learning in science and mathematics contexts such as K-16 classrooms and free-choice learning settings (i.e., museums, zoos, science camps, etc.). Assignments assume the participant is a K-12 teacher or free-choice learning educator enrolled in a graduate licensure program or has access to an educational setting.

SED 573. SCIENCE PEDAGOGY AND TECHNOLOGY I. (4 Credits)

Development of pedagogical content knowledge in grades 6-12 science instruction: learning theory, nature of science, technology integration, and reform recommendations. Lec/lab/rec.

SED 574. MATHEMATICS PEDAGOGY AND TECHNOLOGY I. (4 Credits)

Development of pedagogical content knowledge in grades 6-12 mathematics instruction: learning theory, nature of mathematics, technology integration, and reform recommendations.

Recommended: Investigation of mathematics as it relates to mathematics education and SED 414

SED 576. MATHEMATICS PEDAGOGY AND TECHNOLOGY II. (4 Credits)

Development of additional pedagogical content knowledge in grades 6-12; stress on dominant themes of the school mathematics curriculum including problem solving, reasoning, communication, and connections as well as the integration of technology into the mathematics classroom.
Prerequisites: SED 574 with C or better

SED 577. SCIENCE PEDAGOGY AND TECHNOLOGY II. (4 Credits)

Development of pedagogical content knowledge in grades 6-12; science instruction; learning theory, nature of science, technology integration, and reform recommendations.

Prerequisites: SED 573 with C or better

SED 580. RESEARCH AND EVALUATION. (3 Credits)

Analysis of qualitative and quantitative empirical research in science education, mathematics education and education in general. Development of data collection instruments for use by researchers and teachers of science education, mathematics education and education in general, including portfolio and other forms of alternative assessment.

SED 581. PROFESSIONAL DEVELOPMENT AND PRACTICUM IN MATHEMATICS. (3 Credits)

Developing and implementing a program for continuing learning and evaluation in mathematics education.

SED 582. PERSONAL DIMENSIONS OF FREE-CHOICE LEARNING. (3 Credits)

Investigates the fundamental roles that identity, motivation, interest, prior knowledge and experience, and choice and control play in supporting learning and how learning leaders can build on these dimensions of learning in order to successfully engage lifelong learners.

SED 583. SOCIO-CULTURAL DIMENSIONS OF FREE-CHOICE LEARNING. (3 Credits)

Investigates connections between theories of free-choice learning and the fundamental concepts of sociology, social psychology and anthropology: social stratification, social structure and interaction, social institutions, and cultural background. Real world examples will be included to support learning leaders' efforts to facilitate the socio-cultural dimensions of lifelong science and mathematics learning.

SED 584. PHYSICAL DIMENSIONS OF FREE-CHOICE LEARNING. (3 Credits)

Learning is influenced by the interaction of variables within three contexts—personal, socio-cultural and physical. This course focuses on how macro-scale environmental factors (e.g. space, crowding, novelty) and micro-scale environmental factors (e.g. design elements, real objects, different media) support free-choice learning.

SED 592. PROFESSIONAL DEVELOPMENT AND PRACTICUM IN SCIENCE. (3 Credits)

Developing and implementing a program for continuing learning and evaluation in science education.

SED 594. ADVANCED INSTRUCTIONAL STRATEGIES IN SCIENCE AND MATHEMATICS. (3 Credits)

Explore instructional strategies and skills for K-12 science and math teachers to support student learning rigorous content.

SED 595. ASSESSMENT AND EVALUATION. (3 Credits)

Examines education assessment focusing on formative assessment in multiple contexts across learning environments.

SED 597. PROFESSIONAL DEVELOPMENT IN MATHEMATICS AND SCIENCE EDUCATION. (3 Credits)

Development of strategies and skills for developing, implementing and evaluating a program of professional development for mathematics or science educators considering various choices of program settings.

SED 598. MATHEMATICS AND SCIENCE CURRICULUM. (3 Credits)

Current trends, history of these trends, and rationale for mathematics and science curriculum reform across learning environments.

SED 599. TOPICS IN SCIENCE EDUCATION. (3 Credits)

Current issues, trends, and topics in science education. May be repeated for credit with different topics.

This course is repeatable for 18 credits.

SED 601. RESEARCH. (1-16 Credits)

This course is repeatable for 16 credits.

SED 603. DISSERTATION. (1-16 Credits)

This course is repeatable for 999 credits.

SED 605. READING AND CONFERENCE. (1-16 Credits)

This course is repeatable for 16 credits.

SED 606. PROJECTS. (1-16 Credits)

This course is repeatable for 16 credits.

SED 607. SEMINAR. (1-16 Credits)

This course is repeatable for 16 credits.

SED 608. WORKSHOP. (1-16 Credits)

This course is repeatable for 16 credits.

SED 611. SURVEY OF RESEARCH ON TEACHING. (3 Credits)

Critical analysis of perspectives of research in science/math education with a focus on teaching as the unit of analysis.

Prerequisites: SED 580 with C or better

SED 612. QUANTITATIVE RESEARCH DESIGN AND CRITICAL ANALYSIS. (3 Credits)

A study of quantitative research designs and analytical procedures with specific applications in science or mathematics education.

Prerequisites: SED 580 (may be taken concurrently) with C or better

SED 613. LEARNING THEORY. (3 Credits)

Provides a critical overview and analysis of current theories of learning and development, beginning with a discussion about what learning is, how it has been viewed and studied over time, and how seminal theories inform an understanding of lifelong learning and its facilitation.

Prerequisites: SED 580 (may be taken concurrently) with C or better

SED 615. PRACTICUM IN MATHEMATICS/SCIENCE IN COLLEGE TEACHING. (3 Credits)

Supervised field practicum in college mathematics/science teaching.
This course is repeatable for 9 credits.

SED 621. SURVEY OF RESEARCH ON LEARN. (3 Credits)

Critical analysis of perspectives on student thinking and learning in science/math education.

Prerequisites: SED 580 (may be taken concurrently) with C or better

SED 622. QUALITATIVE RESEARCH TECHNIQUES. (3 Credits)

A study of qualitative research designs and analytical procedures with specific applications in science and mathematics education.

Prerequisites: SED 580 (may be taken concurrently) with C or better

SED 623. CURRICULUM THEORY. (3 Credits)

Establishes theoretical grounding of curriculum. Includes theoretical background, practical knowledge, and skills related to science and mathematics curriculum, including the history, curriculum theory and practice.

Prerequisites: SED 580 (may be taken concurrently) with C or better

SED 625. CRITICAL PEDAGOGY. (3 Credits)

Builds a foundation in critical pedagogy theory and practice. Includes reading of classic and contemporary literature by recognized thinkers in the fields of critical pedagogical studies, requiring careful evaluation of empirical research and synthesis to develop a coherent point of view. Develops methodologies for analyzing data using critical pedagogical theories and intersectional perspectives.

SED 699. SPECIAL TOPICS. (1-16 Credits)

This course is repeatable for 16 credits.

SED 808. WORKSHOP. (1-16 Credits)

This course is repeatable for 99 credits.