

Course Description**EEC3211 | Science, Technology, and Mathematics (STEM) Methods for ECE I | 3.00 credits**

The student will learn to use scientific and mathematical educational neuroscience research-based methods and strategies to teach inquiry and problem-solving skills and plan activities for young children that foster exploration in the sciences. (Ten hours of clinical experience required in an approved prekindergarten inclusion setting: 1 observation required.) Pre/ Co-requisites: EDF3115, EEC3301. Special Fee.

Competency 1:

The student will identify learning outcomes for young children in science by:

1. Listing appropriate disciplinary core ideas of physical, life, and earth/space sciences for young children, including physical characteristics and basic needs of living things, properties of matter, magnets, types of energy, conservation, balance, weight, distance, weather, climate, gravity, space, and the properties and characteristics of sound and light
2. Describing young children's process of scientific inquiry, its application to the early childhood indoor and outdoor learning environments, and ways to nurture children's natural curiosity by encouraging them to explore and make discoveries about their world by using their senses to gain information, make observations, create hypotheses, draw conclusions and report outcomes across the curriculum
3. Explaining how to promote children's cognitive development, critical thinking skills, and understanding of their world through active, hands-on exploration of disciplinary core ideas of physical, life, and earth/space sciences, strategies, and processes
4. Planning developmentally appropriate activities to promote understanding of scientific principles (e.g., develop intellectual curiosity, solve problems, make decisions, and become critical thinkers) through play, small group projects, open-ended questioning, group discussion, problem solving, observation and documentation, cooperative learning and inquiry experiences
5. Providing appropriate ways for young children to communicate their scientific understanding verbally and in writing (with pictures, graphs, and words)
6. Identifying appropriate learning objectives and aligning lesson planning and activities with state learning standards and standards set by professional associations
7. Developing lesson plans that promote children's scientific ability by providing opportunities to observe, describe, hypothesize, document, measure, classify and order
8. Adapting science activities, materials, equipment, and environments as needed to meet the needs of all learners, including English Language Learners and children with special needs

Competency 2:

The student will identify learning outcomes for young children in math by:

1. Summarizing the sequential development of mathematical concepts, including numbers, operations, patterns, functions, algebra, geometry, spatial sense, temporal concepts, measurement, data analysis, and probability
2. Evaluating and selecting developmentally appropriate activities, materials, equipment, and design of learning environments to support the attainment of math and promote thinking and problem-solving skills in young children
3. Describing how to create indoor and outdoor environments that encourage emergent numeracy by offering children varied, meaningful, and concrete learning experiences
4. Planning developmentally appropriate activities to promote understanding of mathematical principles (e.g., developing intellectual curiosity, solving problems, making decisions, and becoming critical thinkers) through play, small group projects, open-ended questioning, group discussion, problem-solving, observation and documentation, cooperative learning, and inquiry experiences
5. Providing appropriate ways for young children to communicate their mathematical understanding verbally and in writing (with pictures, graphs, and words)
6. Identifying appropriate learning objectives and aligning lesson planning and activities with state learning standards and standards set by professional associations

7. Developing lesson plans that promote children's mathematic ability by providing opportunities to observe, describe, hypothesize, document, measure, classify and order
8. Adapting math and science activities, materials, equipment, and environments as needed to meet the needs of all learners, including English Language Learners and children with special needs
9. Identifying community resources for field trips to enhance math concepts and community resources (such as community recycling/re-use centers) that could be used to support young children's understanding of math concepts

Competency 3:

The student will identify developmentally appropriate uses of technology with young children by:

1. Evaluating the research about appropriate uses of technology with young children
2. Identifying the research, events, and advances in technology on curriculum and instructional strategies in early childhood
3. Identifying developmentally appropriate software for early childhood programs
4. Identifying strategies to appropriately integrate technology into early childhood programs
5. Discussing how technology can be philosophically and physically integrated to support the development of math and science concepts in the curriculum

Competency 4:

The student will identify methods of program and setting evaluation and uses for evaluation results by:

1. Explaining how assessment information is interpreted and used to inform developmentally appropriate learning activities
2. Using a variety of assessment strategies to monitor children's progress in achieving outcomes and planning learning activities
3. Evaluating and selecting developmentally appropriate activities, materials, equipment and design of learning environments to support the attainment of math and science concepts and promote thinking and problem-solving skills in young children
4. Identifying strategies for formally and informally assessing children's knowledge of math and science concepts and appropriately differentiating instruction to meet a variety of children's needs

Competency 5:

The student will integrate science, math, and technology into daily classroom activities by:

1. Reviewing, evaluating, and integrating position statements by professional associations related to math, science, and technology into daily practice with young children
2. Identifying and using the Florida Birth to Three Standards and Florida Four Year Old Standards for children to inform lesson planning and implementation
3. Researching national standards, policies, and position statements to inform knowledge and practice
4. Describing techniques for integrating math and science throughout the daily curriculum
5. Evaluating children's books, software, manipulatives, music, blocks, and other materials that enhance math and disciplinary core ideas of physical, life, and earth/space sciences for developmental appropriateness
6. Identifying activities that promote active learning through play, such as independent exploration, discovery, and multisensory involvement
7. Identifying activities that support the development of language arts, mathematics, science, and social studies concepts
8. Selecting activities that support the development of critical thinking and problem-solving skills, knowledge of cause-and-effect relationships, and the ability to predict outcomes
9. Identifying developmentally appropriate strategies to meet the needs of children with different learning styles and multiple intelligences and the communication and language needs of children with limited English proficiency
10. Explaining how instructional methods involving various types of thinking, such as exploration, discovery learning, and problem-solving, can enhance children's mathematical and scientific understanding and vocabulary

Competency 6:

The student will apply concepts from human development and learning theories by:

1. Aligning instruction with state-adopted standards at the appropriate level of rigor

2. Sequencing lessons and concepts to ensure coherence and required prior knowledge
3. Designing instruction for students to achieve mastery
4. Selecting appropriate formative assessments to monitor learning
5. Using diagnostic student data to plan lessons
6. Developing learning experiences that require students to demonstrate a variety of applicable skills and competencies

Competency 7:

The student will maintain a student-centered learning environment that is safe, organized, equitable, flexible, inclusive, and collaborative by:

1. Organizing, allocating, and managing the resources of time, space, and attention
2. Managing individual and class behaviors through a well-planned management system
3. Conveying high expectations to all students
4. Respecting students' cultural, linguistic, and family backgrounds
5. Modeling clear, acceptable oral and written communication skills
6. Maintaining a climate of openness, inquiry, fairness, and support
7. Integrating current information and communication technologies
8. Adapting the learning environment to accommodate the differing needs and diversity of students
9. Utilizing current and emerging assistive technologies that enable students to participate in high-quality communication interactions and achieve their educational goals

Learning Outcomes:

- Communicate effectively using listening, speaking, reading, and writing skills
- Formulate strategies to locate, evaluate, and apply information
- Use computer and emerging technologies effectively