

Course Description

This course covers contemporary teaching/learning strategies for mathematics and science instruction in early childhood and elementary classrooms. Instructional techniques integrate hands-on learning, manipulatives, the student's environment, functional uses of mathematics and science, and assessment strategies appropriate for all students. The focus will be on the nature of children's science and mathematics learning, the teacher as a facilitator of meaningful learning, and New York State and National Learning Standards for science, mathematics, and technology.

Constructivism, the idea that individuals must build knowledge from their own experiences and thought, provides an underpinning for insights into the nature of children's learning in the life and physical sciences and in mathematics.

Includes field trip component. Prerequisites: Either Educ. 214 or SpEd. 234, and Math. 140. Pre- or co-requisite: Math. 141. 4(4-0).

STANDARDS/OUTCOMES			LEARNING OUTCOME	ASSESSMENT
CF	NAEYC	ACEI		
A2, B1, B2, C1	1a	1.0,2.2,2.3,3.1, 3.2,3.4,5.1	1. Demonstrate an understanding of the nature of children's learning in science and mathematics.	Annotated Bibliography, Field Visits, Math Fair, Integrated Lesson Plan, Science Fair
A2, B1, B2, C1	1b, 2a	1.0, 2.2, 2.3, 3.1, 3.2, 3.4, 5.1,5.2	2. Demonstrate knowledge of the role of school and home environments in children's attitudes toward and learning of mathematics & science.	Integrated Lesson Plan
A2, B1, B2, C1	4c	1.0, 2.2, 2.3, 3.1, 3.2, 3.4, 5.1	3. Demonstrate an understanding of developmentally appropriate teaching practices in science and mathematics for preschool, primary, and intermediate students.	Annotated Bibliography, Field Visits, Math Fair, Integrated Lesson Plan, Science Fair
B2, C1, C2	5a, 5b, 5c, 6b	2.2, 2.3, 3.1,3.3,3.4,3.5, 4.0, 5.1	4. Demonstrate an understanding of and ability to use the New York State Learning Standards and Resource Guides for Mathematics, Science and Technology, as well as other guiding documents (e.g., National Science Education Standards and the National Council for Teachers of Mathematics [NCTM] Standards) for teaching.	Math Fair, Integrated Lesson Plan, Science Fair
A2, B1, B2, C1	1c, 4b, 4c, 4d, 5c	2.1, 2.2, 2.3,2.4, 3.1,3.2,3.3,3.4, 3.5, 5.1	5. Design, implement, and evaluate lesson plans and learning environments for science and mathematics education that promote active investigation, encourage reflection, support collaborative work, and meet the needs of diverse students (e.g., students of both sexes and students with socioeconomic disadvantages, limited English proficiency, or disabilities).	Field Visits, Integrated Lesson Plan, Science Fair
A1, B1, B2, C1	4a, 4b, 4c, 4d, 5b	2.1, 2.2, 2.3,2.4, 3.1,3.2,3.3,3.4, 3.5,4.0	6. Demonstrate an understanding of how learner-centered strategies can assist students to develop science and mathematics concepts, such as problem solving; scientific & mathematical reasoning; spatial & environmental awareness; number & numeration; operations; patterns, functions, & algebra; modeling, multiple representations, & connections; measurement, observation, & data analysis; communication.	Integrated Lesson Plan
A1, C2	4b, 5b	2.1, 2.2, 2.3,2.4, 3.1, 3.3, 5.1, 5.2	7. Demonstrate an understanding of the place of inquiry and problem-solving objectives in science and mathematics teaching.	Science Fair
C1, C2	3a, 4b, 4c, 5b, 6c	2.1, 2.2, 2.3,2.4, 3.1, 3.3, 5.1	8. Demonstrate an understanding of the teaching and learning of science and mathematics as an ongoing and collaborative inquiry-based process (both from teacher and student perspectives).	Integrated Lesson Plan
B1, B2	1c, 3c, 4a, 4b	1.0,2.1, 2.2, 2.3, 3.1,4.0	9. Demonstrate an understanding of the role of questioning in supporting children's observations and gaining a sense of their scientific and mathematical interests and thinking.	Field Visits, Math Fair, Integrated Lesson Plan
A1	4c, 5c	2.1, 2.2, 2.3, 3.1,4.0	10. Demonstrate an understanding of the interrelationship among science, mathematics, and technology and the modes for lesson delivery to integrate mathematics, science, and technology instruction.	Field Visits, Integrated Lesson Plan
A2, B1, B2, C1	1a, 1b, 4b	2.2, 2.3, 3.1, 3.2, 3.4,5.1	11. Explore and analyze alternative strategies for meeting the mathematics and science curriculum goals of students with special learning needs.	Field Visits, Math Fair, Integrated Lesson Plan, Science Fair
C1	3b, 4d, 6b	1.0,2.1, 2.2, 2.3, 3.1, 3.2,3.3, 3.4,3.5,4.0, 5.1	12. Demonstrate knowledge of informal and formal strategies used to document and assess science and mathematics learning, with special attention to those modes of assessment recognized by the NYS Education Department.	Field Visits, Math Fair, Integrated Lesson Plan

Selected Bibliography

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Conceptual Framework Strands and Outcomes

A. Teacher as Scholar

A Rigorous Liberal Arts and Sciences Education

1. Candidates demonstrate, appreciate, and advocate the value of a broad range of knowledge and skills in the liberal arts and sciences and are able to use oral and written communication skills effectively to analyze and convey information.
2. Candidates use appropriate technologies to enhance instruction and to promote active learning.

B. Teacher as Constructivist Educator

The Ability to Meet the Educational Needs of All Students

1. Based on their knowledge of student development within the context of family, school, and community, candidates understand how to create a classroom environment to help all students become successful learners.
2. Candidates use teaching and learning strategies consistent with an understanding of multiple perspectives, cultural and linguistic diversity, and different learning styles, and act in ways that welcome and encourage diversity.

C. Teacher as Reflective Practitioner

A Professional Commitment to Inquiry and Reflective Practice

1. Candidates understand the role of educational research in the classroom and apply that research in their teaching.
2. Candidates demonstrate ongoing professional growth as they implement new strategies, reflect on their teaching and its impact on their students, and adjust and revise their practices based on student needs and changing circumstances, and base curricular decisions on evidence of student learning.

Dispositions

All candidates will demonstrate a positive attitude toward teaching and learning by:

Developing a Professional Stance

- Meeting professional and ethical standards
- Communicating appropriately and working collaboratively
- Demonstrating a commitment to child advocacy

Demonstrating Active Engagement in Teaching

- Promoting active learning for all students
- Demonstrating a commitment to reflective inquiry and practice
- Seeking and responding to opportunities for change and growth

Welcoming Diversity

- Treating all people with respect
- Seeking out curriculum materials that respect and support diversity