

**AUGUSTA STATE UNIVERSITY  
COLLEGE OF EDUCATION  
DEPARTMENT OF TEACHER DEVELOPMENT**

**COURSE TITLE:** Early Childhood Science Education I - Physical, Earth, and Space Science

**COURSE PREFIX AND NUMBER:** ECED 3231

**HOURS:** 2-2-3

**Instructor:** Dr. Barry Thompson

**Office:** 368; Phone – 737-1533;

**Text:** Abruscato, Joseph. Teaching Children Science: Discovery Activities & Demonstrations for Elementary & Middle Grades

**COURSE DESCRIPTION:** Teachers of grades Pre-K - 5 usually are generalists who teach most, if not all school subjects. A primary task of these teachers is to lay the experiential, conceptual, and attitudinal foundation for future learning in science by guiding students through a range of inquiry activities. This course will include experiences that engage prospective teachers in active learning that builds on their knowledge, understanding, and ability. The course will address issues, events, problems, and process skills in Physical, Earth, and Space Science in grades Pre-K through 5. The students will be expected to integrate knowledge of science, learning, and pedagogy and apply that knowledge to science teaching.

**CONCEPTUAL FRAMEWORK PRINCIPLES ADDRESSED:**

1. understand the central concepts, tools of inquiry, and structures of the discipline(s) and be able to create learning experiences that make these aspects of subject matter meaningful for learners.
4. understand and use a variety of instructional strategies to encourage the learner's development of critical and creative thinking, problem solving, and performance skills.
6. use knowledge of effective verbal, nonverbal, and information technology techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.
7. plan instruction based on knowledge of subject matter, the learners, the community, and curriculum goals.

**SPECIFIC COURSE OBJECTIVES:**

The following objectives are based on the National Science Education Standards from the National Science Teachers Association and the Guidelines for Preparation of Early Childhood Professionals developed by the National Association for the Education of Young Children

Students will be able to:

1. actively investigate phenomena that can be studied scientifically, interpreting results, and making sense of findings consistent with currently accepted scientific understanding (PSC 6, 11, 12 ; ACEI 14.3, 14.4 ; NSTA 2.1, 2.8, 2.9, 2.11 ).
2. use scientific literature, media, and technological resources that expand their science

knowledge and their ability to access further knowledge (PSC 6, 10, 11; ACEI 2.1, 6.1, 9.0 ; NSTA 2.1, 2.8, 2.10, 2.12 ).

3. use national standards, state and local curriculum to plan inquiry experiences in physical and earth sciences for grades pre-k through 5 in physical, earth, and space science (PSC 6, 14 ; ACEI 4, ; NSTA 2.1 ).

4. build on their current science understanding, ability, and attitudes (PSC 6 ; ACEI 14.1 ; NSTA 2.1, 2.8).

5. understand the nature of scientific inquiry, its central role in science, and how to use the skills and processes of scientific inquiry (PSC 6, 11, 12 ; ACEI 14.3, 14.4 ; NSTA 2.5, 2.9, 2.10, 2.11).

6. make conceptual connections within and across science disciplines, as well as to mathematics, technology, and other school subjects (PSC 6 ; ACEI 4.3, 5.0 ; NSTA 2.1, 2.5, 2.12).

7. develop and manage inquiry experiences to help young children develop intellectual curiosity, solve problems, make decisions, and become critical and creative thinkers based on national standards, state and local curriculum, and professional judgment (PSC 6, 10, 11, 12 ; ACEI 5.4, 9.3 ; NSTA 2.2, 2.5, 2.9).

8. understand how students differ in their approaches to learning science and be able to create instructional opportunities that are adapted to diverse learners (PSC 6; ACEI 6.0, 9.2 ; NSTA 1.1 ).

9. use informal and formal assessment strategies to assess young children's development and learning and engage children in self-assessment (PSC 3, 6, 12 ; ACEI 4.2, 5.4, 5.5 ; NSTA 2.6 ).

10. reflect on their practices, continually self-assess and critically evaluate the effects of their choices and actions on others ( ACEI 7.1 ; NSTA ).

### **COURSE OUTLINE:**

1. The nature of science
  - a. science attitudes
  - b. science process skills
  - c. science knowledge
2. How do children learn science
  - a. Preconceptions and misconceptions
  - b. constructivist learning
3. Planning for constructivist science
  - a. concept mapping
  - b. planning the lesson
  - c. evaluation of learning
  - d. national science standards
  - e. Georgia Performance Standards for science content

4. Teaching methods that help learners to construct meaning
  - a. inquiry and discovery
  - b. constructivist teaching
  - c. research about science teaching
5. Questioning for learning
  - a. types of questions
  - b. using questions to involve all students
  - c. wait time
  - d. using students answers
6. Promoting scientific literacy
  - a. reform efforts
  - b. science and technology
7. Science content
  - Topic: Physical Science Concepts -
    - Magnetism Interactions
    - Electrical Energy
    - Energy/Heat
    - Sound Energy
    - Machines and Forces
    - Matter
    - Light/Color
  - Topic: Earth Science Concepts -
    - Earth Materials
    - Earth History
    - Weather and Climate
  - Topic: Space
    - Time
    - Solar System
    - Gravity
    - Laws of Motion

#### **TECHNOLOGY COMPETENCIES:**

Competency 6 - ability to use telecommunications

Competency 7 - ability to integrate telecommunications

Competency 9 - ability to use multimedia CD-ROM and laserdisc to access information

**BIBLIOGRAPHY:** Available upon Request.