University of Arkansas – Fort Smith
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General Syllabus

ELML 4303 STEAM Curriculum, Instruction, and Assessment

Credit Hours: 3 Lecture Hours: 3 Laboratory Hours: 0

Prerequisite: BIOL 1153/1151 Biological Science/Laboratory, and PHYS 2713/2711 Physical Science/Laboratory
Prerequisites or corequisites: EDUC 4203 Social Studies Curriculum, Instruction and Assessment, ELML 4102 Practicum II, and READ 3903 Disciplinary Literacy

Effective Catalog: 2019-2020

I. Course Information

A. Catalog Description

Study of teaching integrated science, technology, engineering, art and mathematics.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

Upon completion of this course, the student will be able to:

1. Explain the nature of science and scientific inquiry.
2. Develop and deliver STEAM integrated, student-centered lessons and lab investigations taking into account factors such as safety measures, grades K-8 classroom dynamics, problem solving, and project-based learning strategies.
3. Apply the engineering design process used to solve real-world problems in grades K-8 lessons.
4. Collect, evaluate, synthesize and present real world data.
5. Brainstorm ways to solve human and environmental problems using STEAM education.
6. Plan formative and summative assessments of students' STEAM literacy.
7. Utilize disciplinary language in scientific investigations and engineering and design challenges.
8. Integrate STEAM content areas to enrich the learning environment and build connections.
9. Demonstrate best practices for STEAM education to support integration of STEAM into all content areas of the K-8 classroom.

B. University Learning Outcomes

STEAM Curriculum, Instruction, and Assessment enhances student abilities in the following areas:

Ethical Decision Making

Students will recognize and analyze ethical dilemmas, based on the ADE Code of Ethics. Students will apply ethical concepts and rules to determine viable alternatives in any given situation.

Global and Cultural Perspectives

Students will reflect upon cultural differences and demonstrate understanding or application of K6 education in a global environment. Students will reflect upon cultural and learning differences including socioeconomic, language, cultural, and special needs as well as neglected or abused children. Students will identify appropriate interventions to enhance learning in diverse environments.

Communication Skills

Students will communicate effectively, both in writing and orally, in a variety of settings. Students will compose coherent documents, article reviews, research and essay papers, and reflections of observations. Students will give class presentations, share student work products orally, and work with children and families as part of practicum and internship experiences.

Analytical Skills

Critical Thinking Skills - Students will draw conclusions and/or solve problems related to student assessment data or issues. Students will access and evaluate appropriate written and electronic information for solving educational problems, conducting educational research, or working with students. Students will reach viable solutions to a problem and be able to justify those solutions.

III. Major Course Topics

A. Content standards
B. Nature of science
C. Leading and managing the STEM classroom and laboratory
D. Laboratory safety and preparation
E. Materials and technology for STEM education
F. Disciplinary literacy in STEM education
G. Constructivism and STEM education
H. Interdisciplinary lesson planning for science, technology, engineering and mathematics
I. Inquiry-based instruction
J. Problem-based learning
K. Engineering practices
L. Formative and summative assessments