Miami Dade College

Course Description

SCE4363 | Advanced Topics in Science Education Practicum | 3.00 credits

The student will design, implement, and examine the alignment of their personal instructional practices to the national framework for K-12 science education, utilizing the action research process. The student will focus on identifying, analyzing, and addressing misconceptions in science in grades 6-12. Sixty hours of clinical experience are required. Pre-requisites: EDF4430, EDG3321, RED3393, SCE4362, TSL4324C; Pre/Co-requisites: EEX3071, SCE3893.

Course Competencies

Competency 1: The student will analyze gaps in students' subject matter knowledge in order to improve instructional delivery by:

1. Researching common scientific misconceptions
2. Explaining the reasons why certain scientific concepts are complex to teach and learn.
3. Eliciting students' preconceptions using a variety of
4. assessment strategies
5. Assessing student learning formatively and determining responsive actions based on formative assessment evidence
6. Addressing scientific misconceptions through the
7. conceptual change process and evidence-based practices

Competency 2: The student will design and manage a variety of classroom activities and laboratory experiments by:

1. Presenting lessons that contain accurate content knowledge
2. Ensuring laboratory safety protocols are properly implemented in their classrooms and during their lessons
3. Developing lessons using the learning cycle and integrating argumentation into their science instruction.
4. Planning lessons in which all students have a variety of opportunities to investigate, collaborate, communicate, evaluate, learn from mistakes, and
5. defend their explanations of scientific phenomena, observations, and data
6. Sequencing lessons and implementing an instructional unit to carry out the goals and objectives of the State and National Standards
7. Selecting and implementing assessments that show all students have learned and can apply disciplinary knowledge, nature of science, science and engineering practices, and crosscutting concepts in practical, authentic, and real-world situations

Competency 3: The student will analyze assessment data from multiple sources to guide instructional decisions by:

1. Selecting formative and summative assessments that match learning objectives, leading to student mastery.
2. Utilizing various assessment tools to monitor student progress, achievement, and learning gains.
3. Implementing assessments that show all students have learned and can apply science concepts in practical, authentic, and real-world situations
4. Collecting formative and summative evidence and reflecting on the analysis of science-specific assessment data to inform future planning and teaching

Competency 4: The student will develop an understanding of the significance of educational research to the teaching and learning of science by:

1. Identifying and exploring refereed science education journals.
2. Utilizing the library and electronic databases to find specific information about current science educational research in refereed journals.
3. Identifying current educational research pertaining to the teaching and learning of science.

4. Identifying and analyzing the parts and their purposes of a refereed science education journal article.
5. Summarizing and critiquing articles from a refereed
6. science education journal article.

Competency 5: The student will demonstrate knowledge and skills to apply an action research approach to reflect on their own teaching practices to improve their teaching and facilitate their professional growth by:

1. Explaining the stages of action research and effectively apply them to their clinical experience site
2. Identifying a topic for action research grounded in current educational research
3. Locating research literature pertinent to the selected classroom issue to enhance action research procedures
4. Synthesizing information from multiple research studies to develop a literature review.
5. Designing and conducting an action research project at their clinical experience site in order to identify aspects of the educational process in that they wish to enhance.
6. Utilizing action research data, observations of teaching, and interactions with colleagues to reflect on and improve teaching practice.
7. Utilizing the results of multiple assessments and data (both qualitative and quantitative) as part of their action research project to guide and modify instruction to shape learning experiences for students.
8. Writing an action research report and presenting action research presenting findings.
9. Engaging in self-reflection to develop an action plan based on action research findings

Learning Outcomes:

1. Communication
2. Critical Thinking
3. Information Literacy
4. Social Responsibility
5. Numbers / Data
6. Computer / Technology Usage
7. Cultural / Global Perspective