Course Inventory Change Request

New Course Proposal

Date Submitted: 09/23/15 10:33 am

Viewing: EDUC 5030: Energy in STEM Education
Last edit: 09/23/15 10:33 am
Changes proposed by: D00145681

Course Prefix: EDUC  Course Number: 5030
Effective Semester: Spring 2016  
Department: Education (EDUC)  
School: School of Education  
Course Title: Energy in STEM Education  
Short Course Title: Energy in STEM Ed  
Credits: 3  
Workload Factors: 4.5  
Primary Grade Type: Standard Letter  
Secondary Grade Type:  
Instructor: Yes  
Permission Required:

In Workflow
1. EDUC Chair  
2. ED Admin  
3. ED Dean  
4. University Curriculum Committee Chair  
5. Banner

Approval Path
1. 09/23/15 10:43 am Chizu Matsubara (matsubara): Approved for EDUC Chair  
2. 09/23/15 11:04 am Robyn Whipple (whipple): Approved for ED Admin  
3. 09/23/15 11:32 am Brenda Sabey (sabey): Approved for ED Dean

EDUC 5030: Energy in STEM Education

Repeatability: No

Schedule Type: Lecture
Hrs/Wk: 4

Catalog Prerequisites: Yes

Catalog Prerequisites: Instructor permission required.
Grade Required on Prerequisite(s): N/A

Corequisites: No

Course/Lab Fee: No

Instruction Index Code: FED214

Catalog Description: This course provides teachers with a deep and useful understanding of energy and the nature of how students use concepts of energy to make sense of phenomena across life, earth, and physical science. This understanding enhances teacher insights into: 1) how matter and energy interact, 2) the relationships of energy to forces and interactions within fields, and 3) pedagogical content knowledge around teaching and learning about energy. The course provides teachers with knowledge of how energy concepts may be used by students with the Crosscutting Concepts, and Engineering and Science practices found in the Next Generation Science Standards.

Course Rotation: Spring (even)

Justification for course/change: A new STEM Teaching Endorsement has been approved by the Utah State Office of Education. It consists of a six-course cycle in STEM Education. The School of Education has received a grant to develop and teach the six-course cycle in STEM Education. This is one of the six courses. Other State institutions are also developing similar courses to offer at their institutions as well but they are not yet available to list as comparable courses.
Library Resources Adequate: Yes
Tech Resources Adequate: Yes

Comparable Courses: (use USHE course first)

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<tr>
<th>Institution</th>
<th>Prefix/Number</th>
<th>Credit(s)</th>
<th>Course Title</th>
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Course Learning Outcomes:

1. Understand the role of energy in systems in the natural and material world and relate it to STEM instruction in elementary classrooms.
   a. The water cycle requires energy.
   b. Relationships in ecosystems are dependent on energy.
   c. Energy is used in everyday life.
   d. Moving objects contain energy.
   e. Waves can transmit energy.
2. Understand and apply the cross-cutting concept of Energy and Matter in the classroom
   a. The transfer of energy drives the flows and cycles of matter
   b. Matter is conserved as it flows and cycles.
   c. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems’ possibilities and limitations.
3. Explore and implement innovative, research-based, engaging curriculum, especially around the Utah Core academic standards and college and career readiness, geared towards increasing student achievement for ALL students.
   a. Apply the disciplinary core ideas when planning lessons and teaching.
   b. Use crosscutting concepts when planning lessons and teaching.
   c. Implement scientific and engineering practices into lesson planning and teaching.
   d. Use lesson plan formats that integrate all four STEM disciplines into lesson planning and teaching.
   e. Apply a variety of effective assessment strategies into lesson planning and teaching.
4. Develop the confidence, skills and dispositions to be a teacher leader in STEM Education
   a. Prepare and teach model lessons.
b. Plan with colleagues.
c. Complete presentations for local and statewide efforts, etc.
d. Practice continuous written reflection for the purpose of improving your practice

5. Demonstrate proficiency with STEM content, skills, and practices and teach those to students.
a. Communicate using multiple forms of discourse.
b. Develop reasoning and problem solving practices.
c. Facilitate effective collaboration and communication among the students.