Course Inventory Change Request

New Course Proposal

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

Viewing: EDUC 5020: Nature of Science and Engineering

Last edit: 09/23/15 10:33 am

Changes proposed by: D00145681

<table>
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<th>Course Prefix:</th>
<th>EDUC</th>
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<tr>
<td>Course Number:</td>
<td>5020</td>
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<tr>
<td>Effective Semester:</td>
<td>Spring 2016</td>
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<td>Department:</td>
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<td>School:</td>
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<td>Course Title:</td>
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In Workflow

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

Approval Path

1. 09/23/15 10:42 am
   Chizu Matsubara (matsubara): Approved for EDUC Chair
2. 09/23/15 11:03 am
   Robyn Whipple (whipple): Approved for ED Admin
3. 09/23/15 11:32 am
   Brenda Sabey (sabey): Approved for ED Dean
In this course participants will experience introductory explorations of the nature of science using science and engineering principles, practices, and processes. Applications to Science, Technology, Engineering and Mathematics will be explored using learner-based pedagogy. Participants will develop teaching practices to assist them in educating K-6 students in selected Earth and Life Science Standards.

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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<th>Credit(s)</th>
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Course Learning Outcomes:

1. Content Knowledge: Develop a deeper understanding the nature of science and engineering.
   a. Use scientific understanding and engineering solutions for topics relative to climate change and natural selection.
   b. Demonstrate that science is a way of knowing and assumes an order and consistency in natural systems.
   c. Compare and contrast the process of scientific inquiry with the engineering design cycle.
   d. Use empirical evidence to develop scientific knowledge and engineering solutions.

2. Cross Cutting Concept: Explain that stability and change are present in all natural and built systems. Conditions of stability and rates of change or evolution of a system are critical elements of study.
   a. Provide evidence to support natural climate cycles and natural selection.
   b. Demonstrate how rate of change of any natural system impacts evolutionary change.
   c. Provide evidence to support scientific claims using effective argumentation.

3. Connect theory and practice through reflection, teaching, scholarship, collaboration, and STEM educational action research. Include traditionally under-represented groups that consider students of diverse backgrounds and perspectives.
   a. Collaborate with colleagues in lesson development.
   b. Conduct an effective student inquiry-based classroom.
   c. Integrate cross-curricular learning.
   d. Record reflections on how your STEM content and pedagogical thinking changes over the course of the semester.
4. 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.
   d. Demonstrate proficiency in STEM content.
5. Explore and implement innovative, research-based, engaging curriculum and assessment, especially around the Utah Core academic standards and college and career readiness, geared towards increasing student achievement.
   a. Apply the disciplinary core ideas when planning lessons and teaching.
   b. Use cross-cutting concepts when planning lessons and teaching.
   c. Implement scientific practices into lesson planning and teaching.
   d. Implement a variety of assessments into lesson planning and teaching.