**Course Inventory Change Request**

**New Course Proposal**

Date Submitted: 11/24/15 2:45 pm

Viewing: EDUC 5040: Matter in STEM Education

Last edit: 11/24/15 2:45 pm

Changes proposed by: D00171154

Catalog Pages referencing this course

Elementary STEM Endorsement

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<th>EDUC</th>
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<th>5040</th>
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<td>Effective Semester:</td>
<td>Fall 2016</td>
<td></td>
<td></td>
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<tr>
<td>Department:</td>
<td>Education (EDUC)</td>
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Course Title:
Matter in STEM Education

Short Course Title: Matter in STEM Education

Credits: 3

Workload Factors: 4.5

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

**Approval Path**
1. 11/24/15 2:50 pm Chizu Matsubara (matsubara): Approved for EDUC Chair
2. 12/10/15 8:46 am Robyn Whipple (whipple): Approved for ED Dean
This course provides teachers with a deep and useful understanding of matter and the nature of how students use concepts of matter 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 matter to forces and interactions within fields, and 3) pedagogical content knowledge around teaching and learning about matter. The course provides course participants with knowledge of how matter concepts may be used by students with the Crosscutting Concepts, and Engineering and Science practices as outlined in the Next Generation Science Standards. STEM content professors will be involved in the instruction of this course.

School of Education received a grant to develop and teach a six-course cycle in STEM Education for the new STEM Teaching Endorsement offered by the Utah State Office of Education. The grant will pay the tuition for 20 teachers to take all six courses. This course will become part of the STEM Strand for the new Masters in Education Program.
Contact hours 2 per week lecture, 3 per week practicum.

Library Resources
Adequate: Yes

Tech Resources
Adequate: Yes

Comparables Courses:
<table>
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Course Learning Outcomes:

1. Students will understand that the types of atoms present and the interactions both between and within them differentiate matter. The states (i.e., solid, liquid, gas, or plasma), properties (e.g., hardness, conductivity), and reactions (both physical and chemical) of matter can be described and predicted based on the types, interactions, and motions of the atoms within it. Chemical reactions, which underlie so many observed phenomena in living and nonliving systems alike, conserve the number of atoms of each type but change their arrangement into molecules.

2. Students will investigate STEM content and pedagogy related to matter through four of the seven crosscutting concepts found in the Next Generation Science Standards: cause and effect, systems and system models, energy and matter, and stability and change.

3. Students will improve their teaching skill practice by performing the following:
   a. Connect theory and practice through effective teaching, scholarship, and STEM educational action research.
   b. Develop the capacity and confidence to run a student inquiry-based classroom using the crosscutting concepts and core ideas as presented in the Next Generation Science Standards.
   c. Improve ability to design a variety of effective assessment strategies including using formative assessment to design authentic, innovative, problem-based learning experiences.
   d. Explore uses of technological tools to enhance STEM teaching, learning, student achievement, and college and career readiness.
   e. Become a reflective teacher by recording your learning and teaching experiences in a journal and reflecting on your success and need for improvement.
   f. Work with colleagues to develop lesson and assessment plans differentiated according to student
needs for STEM integration for ALL students in your classroom.