MTED 6310 Course Syllabus and Calendar

Research Trends in Mathematics and Science

Summer 2012 (8 weeks)

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Course Description

Course: MTED 6310
Topic: Research Trends in Mathematics and Science
Credits: 3-0
Education Bldg., Room 405, Mondays and Wednesdays, 5:30 pm – 8:20 pm

The course will explore critical issues of the development of fundamental mathematical and
scientific ideas. We will also examine implications for the teaching and learning of
mathematics and science.

All students are expected to stay current with assigned readings and activities and actively
participate in whole class discussions and individual projects.

Instructor Contact Information

This hybrid course is taught by Dr. Olga Kosheleva. She may be contacted within the
Blackboard course system or by email at olgak@utep.edu, or by phone at 915-747-7588.
Dr. Kosheleva's UTEP websites are
http://faculty.utep.edu/Default.aspx?alias=faculty.utep.edu/olgak
http://hb2504.utep.edu/Profile.aspx?ID=olgak
Instructor Office Hours: M/W, 4:00 pm - 5:30 pm, 8:20 pm – 9:20 pm, Educ. 405 or by appointment

Course Learning Outcomes/Goals

Upon completion of this course, students should be able:

- To understand differences and similarities between discipline of mathematics and science
- To develop preliminary understanding of how to write literature review
- To understand the cognitive processes that result in effective learning and teaching of mathematics and science
- To reflect on implementation of the key findings of learning mathematics and science in the classroom with emphasis on creating successful learning environments
- To critique and evaluate the key findings of the learning mathematics and science in order to better understand the phenomenon of effective learning

Recommended Readings

by Curtis McKnight, Andy Magid, and Teri J. Murphy, University of Oklahoma, Norman, OK, and Michelynn McKnight, Norman, OK
American Mathematical Society
2000; 106 pp; softcover
ISBN-10: 0-8218-2016-8

http://www.ams.org/bookstore-getitem/item=MER

- Alexandrov, A. D. Selected works.
- Thomas S. Kuhn, The Structure of Scientific Revolutions (selected chapters).
- Science For All Americans, Rutherford, F. James and Algrehn, Andrew New York, Oxford University Press. (1990)
  Online copy:
  In English
  http://www.project2061.org/publications/sfaa/online/sfaatoc.htm
  In Spanish
  http://www.project2061.org/esp/publications/sfaa/online/sfaatoc.htm

- Book "High School Mathematics at Work"
Book "Adding It Up: Helping Children Learn Mathematics".
http://books.nap.edu/books/0309069955/html/

Other recommended readings and websites (free access)
- This website provides a wide selection of virtual manipulatives for teaching mathematics:
  http://nlvm.usu.edu/en/nav/vlibrary.html
  http://www.nap.edu/catalog.php?record_id=10126
- Educating Teachers of Science, Mathematics, and Technology: New Practices for the New Millennium
  http://www.nap.edu/catalog.php?record_id=9832
- Booklets "Science with Children" available (in both English and Spanish) at the Department of Education.
- National Science Teachers Association (NSTA)
  http://www.nsta.org/
- National Council for Teachers of Mathematics (NCTM)
  http://www.nctm.org/
- National Science Education Standards
  http://www.nap.edu/openbook.php?record_id=4962
- Inquiry and the National Science Education Standards: A Guide for Teaching and Learning
  http://books.nap.edu/catalog.php?record_id=9596
- TEKS (Mathematics)
- TEKS (Science)

Academic Integrity

It is expected that work you submit will represent your own effort (or your own group’s effort, if it is a group project), will not involve copying from or accessing unauthorized resources or people (e.g., from a previous year’s class), and will appropriately acknowledge allowable references that you do consult. If, in future, in your articles and grant submissions you will be using ideas developed and presented by other students in this class, you are required to appropriately acknowledge their contributions. Violations are unacceptable and will be referred to the Dean of Students Office for possible disciplinary action. Don’t resubmit work completed for other classes without specific acknowledgment and permission from me.

If you are found to be cheating or plagiarizing, you will be subject to disciplinary action, per UTEP catalog policy. Refer to http://www.utep.edu/dos/ for further information. In addition, you may also see the Regent Rules and Regulations at http://www.utsystem.edu/bor/rules/
Copyright Notice

Many of the materials that are posted within this course are protected by copyright law. These materials are only for the use of students enrolled in this course and only for the purpose of this course. They may not be further retained or disseminated.

Information about HB 2504 Requirements

_Texas House Bill 2504 requires each institution of higher education’s faculty to provide the following syllabus related items, at a minimum:
1. A brief description of each major course requirement, including each major assignment and examination
2. the learning objectives for the course
3. a general description of the subject matter of each lecture or discussion
4. and, list of any required or recommended readings (provided above).

HB 2504 requirement 1. Course requirements, assignments, examination

Course Policy/Requirements

To be successful in this course, class functionality, assignments and activities rely heavily on your early understanding of expectations. You are also responsible for doing all the work and going over the online lectures every week. These courses take as much, if not more time than traditional classes.

Please check course announcements at least 2 non-consecutive days a week to keep yourself abreast of any changes in course content and deadlines.

1. It is required that you have a UTEP e-mail. You must use your UTEP email account for all correspondence related to this course and check it regularly to ensure that you receive important messages about the course on a timely basis. If you are enrolled in this course, you already have an email account created for you. If you do not remember your UTEP email address and password, please call 915-747-5257 or go to "https://newaccount.utep.edu/";
2. Mandatory file formats: all text attachments you upload to assignments, discussion postings, or email messages must be MS Word documents (.doc) or (.docx); all images should be in JPEG Format (.jpg); of you send your work in a file, its name should always include week submission number and your name (last and first name).
3. The course requires reflection papers written in specific formatting and styles. The general format used by papers in this course is APA version 6.

Students will be required to:

- Actively participate in writing reflective critiques, literature review, presentations and discussion of "mock" grant proposals.
- Participate in all class discussions through presentations and submissions (via regular email) of reflections and critiques.
- Read and critique assigned readings.
• Identify relevant publication venue, prepare and (possibly) submit your completed literature review for publication Final Week.

Course Assignments

1. **Attendance/Participation/ Discussion**: each student is encouraged actively participate in all the activities. This is Hybrid class. If you were absent in F2F session, you will be assigned to do additional work ONLINE.

2. **Writing and presenting "mock" grant proposal** (10-15 pages, not counting references, double spaced, APA style, Word 1997-2003). Reviewing of other groups' proposals. Topic should be connected to STEM integration.

3. **Critiques of Readings** (guidelines provided as appendix to syllabus).

4. **Final Literature Review** (guidelines provided as appendix to syllabus).

What should you expect from me as the instructor?

• I will provide you clear instructions on class expectations
• I will check my email at least three times per week and will answer back to you as soon as possible.
• I will keep you informed about your graded progress in the class at all times and will make time to discuss your needs.
• I will leave myself open to suggestions about improvement of the class and class related activities.
• I will do all I can to ensure your learning and success in this class
• If any changes in the course are to be implemented, I will ensure that the class is notified in a timely manner.

**HB 2504 Requirements 2 and 3. Learning objectives and a general description of the subject matter of each lecture or discussion:**

**Student Learning Objectives/Outcomes**

The course’s learning outcomes will require the student to acquire throughout the semester new knowledge and skills and build upon them. The following table provides a list of the most relevant student learning outcomes for the course.

**Table 1. Student learning outcomes and assessment**
<table>
<thead>
<tr>
<th><strong>Student Learning Outcomes</strong></th>
<th><strong>Assessments</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>By the end of course, the student will be able</strong></td>
<td><strong>To evaluate these outcomes, the faculty members will use the following assessment procedures</strong></td>
</tr>
<tr>
<td>To understand differences and similarities between discipline of mathematics and science</td>
<td>a. Class interactive discussions; b. Written reflections/critiques, mock proposal.</td>
</tr>
<tr>
<td>To understand the cognitive processes that result in effective learning and teaching of mathematics and science</td>
<td>a. Class interactive discussions; b. Written reflections/critiques, mock proposal.</td>
</tr>
<tr>
<td>To reflect on implementation of the key findings of learning mathematics and science in the classroom with emphasis on creating successful learning environments</td>
<td>a. Class interactive discussions; b. Written reflections/critiques, mock proposal.</td>
</tr>
<tr>
<td>To understand the underlying ideas for connecting and integrating mathematics and science</td>
<td>a. Class interactive discussions; b. Written reflections/critiques, mock proposal.</td>
</tr>
</tbody>
</table>

**Course Schedule of Assignments**

Please, look at the course schedule of assignments by clicking on the Syllabus link on the Blackboard homepage of the course.

**Course Schedule Changes**

As course instructor, I reserve the right to adjust the course syllabus or change assignments as needed. I will be sure to give you plenty of notice prior to any changes. Remember that our course syllabus and class schedule are living documents and can be changed!

**Tentative Course Schedule/Calendar of the Assignments**

<table>
<thead>
<tr>
<th>Date</th>
<th>Assignment</th>
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<tbody>
<tr>
<td>(Week 1)</td>
<td>F2F Introduction. Presentation of Library Databases. Discussion on mathematics and science integration. Start working on mock proposal.</td>
</tr>
<tr>
<td>June 8 F2F</td>
<td></td>
</tr>
<tr>
<td>June 10 ONLINE</td>
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<tr>
<td>(Week 2)</td>
<td>Syllabus presentation/discussion. Discussion on mathematics and science integration. Reading 1 (posted on Discussion Board), start working on critique. Start working on mock proposal (guidelines are provided).</td>
</tr>
<tr>
<td>June 15 F2F, June 17 F2F</td>
<td></td>
</tr>
<tr>
<td>(Week 3)</td>
<td>Continue working on critique of Reading 1 (posted on Discussion Board). Discussion of mock proposal format, ideas. Discussion on mathematics and science integration.</td>
</tr>
<tr>
<td>June 22 F2F, June 24 ONLINE</td>
<td>ONLINE class: Submit draft of mock proposal on June 24, 11 pm MT (by email), the initial feedback will be provided on Saturday, June 24 and Sunday, June 25.</td>
</tr>
<tr>
<td>(Week 4)</td>
<td>ONLINE (1) Submit Critique of Reading 1 on June 29, 11 pm MT (by email). (2) Submit second draft of mock proposal on July 1, 11 pm MT (by email).</td>
</tr>
<tr>
<td>June 29 ONLINE, July 1 ONLINE</td>
<td></td>
</tr>
<tr>
<td>(Week 5)</td>
<td>F2F presentations in the class (mock proposals). Start working on Final Literature Review Reviewing of other groups' proposals. Discussion on mathematics and science integration.</td>
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<tr>
<td>July 6, F2F, July 8, F2F</td>
<td></td>
</tr>
<tr>
<td>(Week 6)</td>
<td>Discussion on mathematics and science integration. Continue working on Final Literature Review (individual presentation of current drafts to the professor).</td>
</tr>
<tr>
<td>July 13, F2F, July 15, F2F</td>
<td></td>
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<tr>
<td>(Week 7)</td>
<td>Discussion on mathematics and science integration. Continue working on Final Literature Review. Individual and class presentation of current drafts to the professor.</td>
</tr>
<tr>
<td>July 20, F2F, July 22, F2F</td>
<td></td>
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</table>
Week 8
July 27, F2F, July 29, F2F

Discussion on mathematics and science integration. Continue working on Final Literature Review. Individual and class presentation of current drafts to the professor.

(Finals Week) Aug. 3, ONLINE

ONLINE. Final submissions of Final Literature Review by August 3 (11 pm Mountain Time).

Course Grading

Grade Distribution

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Active Participation/Positive Attitude</td>
<td>20%</td>
</tr>
<tr>
<td>Reflections/Critique</td>
<td>25%</td>
</tr>
<tr>
<td>Presentations (mock proposal, …)</td>
<td>25%</td>
</tr>
<tr>
<td>Final Literature Review</td>
<td>30%</td>
</tr>
</tbody>
</table>

100%

Grading Scale

90 – 100 = A 80 – 89 = B 70 - 79 = C 60 - 69 = D 00 - 59 = F

You are encouraged to demonstrate knowledge of content/ issues discussed in the class, critical thinking, and communication accuracy while completing major course assignments.

Course Schedule and Grading Changes: The course instructor reserves the right to adjust the course syllabus or change assignments as needed. I will be sure to give you plenty of notice prior to any changes. Remember that our course syllabus and class schedule are living documents and can change!

Students with Disabilities

If you have or believe you have a disability, you may wish to identify yourself. You can do this by contacting the Center for Accommodations and Support Services Office to show documentation of a disability or to register for testing and services. Students who have been designated as disabled must reactivate their standing with this office yearly. Please, visit the following website for more details:
http://sa.utep.edu/cass/
**Rubric for your writing (critique/lit review/grant proposal)**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Good (9 points)</th>
<th>Fair (6 points)</th>
<th>Poor (3 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of Content and Summary</td>
<td><strong>Solid knowledge and understanding of the issue you are writing about is demonstrated. All articles are clearly but succinctly summarized - the key points of the article are addressed.</strong></td>
<td><strong>Good knowledge and understanding of the issue you are writing about is demonstrated. The article is clearly summarized, but some sub points are addressed along with main points. The summary is not succinct.</strong></td>
<td><strong>Weak knowledge and understanding of the issue. The article summary is unclear or overly detailed.</strong></td>
</tr>
<tr>
<td>Critical Thinking and Argumentation</td>
<td><strong>Strengths and weaknesses that are central to the key points of the articles are addressed. The discussion of strengths and weaknesses take up the majority of the assignment.</strong></td>
<td><strong>Strengths and weaknesses that are peripheral to the articles are addressed. The discussion of strengths and weaknesses take up the majority of the assignment.</strong></td>
<td><strong>Strengths and weaknesses are addressed peripherally or not at all. The discussion of strengths and weaknesses take up only a small part of the assignment.</strong></td>
</tr>
<tr>
<td>Organization and Communication Accuracy</td>
<td><strong>Paper is well organized, has a very clear intro, body and conclusion. The purpose of the paper is clear from the very beginning. There are no grammatical errors or typos. Page length, formatting requirements are met.</strong></td>
<td><strong>Paper is organized, has an intro, body and conclusion. The purpose of the paper becomes clear within the paper. There are few grammatical errors or typos. Page length, formatting requirements are met.</strong></td>
<td><strong>Paper is not well organized, has an unclear or non-existent intro, body and conclusion. The purpose of the paper is unclear. There are many grammatical errors and/or typos. Page length, formatting requirements are met.</strong></td>
</tr>
</tbody>
</table>