

UNIVERSITY OF TEXAS EL PASO

College of Education- Department of Teacher Education  
Semester: Spring 2020

**Title of Courses (crosslisted):**

**MTED 6310 CRN 28741** (Research Trends in Math/Science Education);

**TED 5319 CRN 28650** (Foundations of STEM Education)

**Class hours: 3**

**Instructor Information: Dr. Olga Kosheleva, Ph.D.**

**Email:** [olgak@utep.edu](mailto:olgak@utep.edu)

**Office hours:** 3:30 – 5:00 pm, Educ. 801D, 5:00 – 5:30 pm, EDU 402,  
or by appointment

**Day/Time: Monday, 5:30 – 8:20 pm, EDU 402**

**Course Description:** This course is designed to help you think about STEM Education (Science, Technology, Engineering and Mathematics). Specifically we will focus on the Foundations of STEM Education, and research trends in Math/Science Education.

**For Technical Assistance: For technical problems with our online course site or related computer/Internet applications, please contact the UTEP Helpdesk: M - F: 7AM - 8PM, Sat: 9AM - 1PM, Sundays 11-4 pm.** On campus phone: 915.747.5257. Off campus: 915.747.4357. If you are on campus, you may also visit the ATLAS lab located within the Undergraduate Learning Center (UGLC building) or the Technology Support Center in Room 300, Library.

**Required Reading:**

This course does not require the purchase of a textbook. All the required readings and video/audio files for the course are provided via OneDrive and/or via Blackboard. You will be actively searching Electronic Databases provided by UTEP to find additional relevant readings.

*Suggested Online Texts (available for free download):*

How students learn: History, mathematics & science in the classroom (2005). Available from: <https://www.nap.edu/catalog/10126/how-students-learn-history-mathematics-and-science-in-the-classroom>

Helping Children Learn Mathematics

<https://www.nap.edu/catalog/10434/helping-children-learn-mathematics>

Adding It Up Helping Children Learn Mathematics

<https://www.nap.edu/catalog/9822/adding-it-up-helping-children-learn-mathematics>

Mathematics learning in early childhood: Pathways towards equity and excellence (2009).

Available from: <https://www.nap.edu/catalog/12519/mathematics-learning-in-early-childhood-paths-toward-excellence-and-equity>

Learning and Understanding Improving Advanced Study of Mathematics and Science in U.S. High Schools

<https://www.nap.edu/catalog/10129/learning-and-understanding-improving-advanced-study-of-mathematics-and-science>

Science and Engineering for Grades 6-12 Investigation and Design at the Center

<https://www.nap.edu/catalog/25216/science-and-engineering-for-grades-6-12-investigation-and-design>

Successful K-12 STEM education (2011). Available from:

<https://www.nap.edu/catalog/13158/successful-k-12-stem-education-identifying-effective-approaches-in-science>

STEM Integration in K-12 Education (2014). Available from:

<https://www.nap.edu/catalog/18612/stem-integration-in-k-12-education-status-prospects-and-an>

English Learners in STEM Subjects

<https://www.nap.edu/catalog/25182/english-learners-in-stem-subjects-transforming-classrooms-schools-and-lives>

Surrounded by Science Learning Science in Informal Environments

<https://www.nap.edu/catalog/12614/surrounded-by-science-learning-science-in-informal-environments>

Booklets "Science with Children" available (in both English and Spanish) at the Department of Education.

<http://www.ed.gov/pubs/parents/Science/index.html>

<http://www.ed.gov/pubs/parents/Ciencia/index.html>

Next Generation Science Standards [NGSS]. Available at:

<https://www.nextgenscience.org>

National Science Teachers Association (NSTA)

<http://www.nsta.org/>

Common Sense Media Non-profit. (for Technology) Available at:

<https://www.common Sense Media.org/about-us/our-mission>

American Society for Engineering Education [ASEE]. Available at:

<https://www.asee.org/>

Engineering Design Process

<http://www.eie.org/overview/engineering-design-process>

National Council of Teachers of Mathematics [NCTM]. Available at:  
<http://www.nctm.org/>

Texas Essential Knowledge and Skills [TEKS]. Available by grade level and content focus at:  
<https://tea.texas.gov/curriculum/teks/>

Help with the grammar

<https://www.grammarly.com/>

### **UTEP Learning Resources:**

(UTEP provides a variety of student services and support, including the resources below.)

**UTEP Library:** You can access to a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.

**The University Writing Center (UWC):** Virtually everyone needs help with writing academic English. There's no shame in it. The UWC [Library Building, Rm.227; phone: 915.747.5112] provides online consultations to all UTEP students at no cost. They also have walk-in services, if you are local. It is a terrific resource. If I suggest you attend the Writing Center, it's because I think you will benefit from it. It's not a punishment – it's intended to help you. Check the website for more information: <http://uwc.utep.edu>

**Standards of academic integrity:** Students are expected to uphold the highest standards of academic integrity. Any form of scholastic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to: cheating, plagiarism, collusion [making plans to cheat with another], the submission for credit of any work or materials that are not attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures (HOP) and available in the Office of the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grades on the work in question, to failing grades in the course, to suspension or dismissal among others.

**Students with Disabilities statement:** If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Center for Accommodations and Support Services (CASS) located in Union E Room 106. Students who have been designated as having a disability must reactivate their standing with CASS on a yearly basis. Failure to report to this office will place a student on the inactive list and nullify benefits received. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the director of CASS. You may call 919-747-5148 for general information about the Americans with Disabilities Act (ADA).

**Student Conduct and Discipline:** All students are expected and required to obey the law and to comply with Regent, Rules, and Regulations (<http://www.utsystem.edu/bor/rules>) with system and University rules, with directives issued by an administrative official in the course of his or her authorized duties and to observe the standards of conduct appropriate for the university.

**Equal Opportunity:** All students regardless of gender, age, class, race, religion, physical disability, sexual orientation, etc., shall have equal opportunity without harassment in this course. Any problems with or questions related to this can be discussed confidentially with Dr. Kosheleva.

**Inclusiveness and equity:** Learning happens only when we feel respected as a whole human being. Our top priority in our classroom is to cultivate relationships of trust and respect and a sense that we see each other as whole, complex human beings. That you experience this in our classroom is important for the sake of your learning in our course and for the sake of your future students' learning, so that you feel able to cultivate such relationships with them. To that end, we want you to know that all of you are welcome in our classroom space—all the parts of you as a person are welcome in our discussions, our activities, our assignments, and in our assessments. We are all complex people with a variety of perspectives, experiences, challenges, assets, and resources—our gender identities, our sexual orientations, our religions, our races, our ethnicities, our economic statuses, our immigration statuses, our parenthoods, our veteran statuses, our ages, our languages, our abilities and disabilities. All the parts of you are welcome in our learning community to the extent that you feel comfortable bringing them in. We strive to show respect for the variety and wholeness in each of you, and we expect that each of you show respect for each other as well. If you feel marginalized in our class, and you feel comfortable discussing it, we would like to know so that we can support you, protect you, and make changes that feel more inclusive and equitable. You can also talk with our Department Chair and/or you can report a complaint of discrimination to the University's Equal Opportunity Office, Kelly Hall, Third Floor, 915-747-5662 or eoaa@utep.edu.

### **Guide to Online Etiquette:**

As a member of the learning community of this class, the following is a list of specific expectations.

(Note that this list is not exhaustive and that it may be added to as needed throughout the semester):

1. You are expected to actively engage in the learning community of this class.

This includes: completing the coursework tasks as outlined in each week's session, actively contributing to discussions, seeking guidance if you have questions (note that if you have a question, it is likely that everyone will benefit if ask your question) and exhibiting professional courtesy during interactions with classmates/ your instructor. Class participation includes, but is not limited to engaging in in-class activities and writing, volunteering inputs in class discussions, answering questions, defending personal viewpoints, and presenting completed assignments to your classmates.

2. You are expected to exhibit appropriate behavior for a higher learning environment.

Even though we will not meet face-to-face, logging on to our online course site is the equivalent

of walking on to the UTEP campus. Therefore, the rules of conduct that apply on campus also apply in our course site. Our course site is a place to engage in social learning; it is meant to be a safe space for all. Our ideas and beliefs shape who we are, and will differ from our peers; sharing these within class allows us to learn different perspectives and points of view, but this can only happen successfully if everyone in our learning community is respectful of individual ideas. You are encouraged to participate in all activities to the fullest extent possible, with an open mind to new experiences. In particular, the following are general guidelines for online interactions:

All the information discussed between peers and/or with your instructor should be kept confidential, thus providing a safe atmosphere for creative expression, free of judgment. You are encouraged to participate to the depth that you feel comfortable sharing with the class. Note: An electronic record will remain, so be thoughtful in how much personal information you share. The general rule is share only that which you would be comfortable seeing printed in a newspaper/ public Internet page).

-Do not use inappropriate language, all capital letters, or language short cuts.

All entries should reflect academic writing standards, with edited spelling, grammar, and punctuation.

-When reacting to someone else's message, whether in agreement or disagreement, please address the ideas, not the person.

3. *You are expected to exhibit high-level time management skills and turn your work in ON TIME.* As previously mentioned, this is a fast-paced, intensive course that requires you to devote significant time to complete the required readings, discussions and various additional assignments that are due each week. Although there is no mandatory time that you must be online, the research shows that those with the best success in online courses create a set schedule for coursework and stick to it (whether you do your work at 3am or 10am on whatever day does not matter, what matters is just that you allow a sufficient, set time each week of the semester to focus on coursework). Timely completion of all coursework is essential for this class to run smoothly (i.e. your classmates rely on you to do your readings early in the week and contribute to the discussion on time in order for them to be able to post feedback later in the week). Therefore, late work will NOT be accepted. All online assignments are due by the due date and time listed in the task directions (see each weekly session in our course site for specific details). Please ensure that you carefully read all instructions for each assignment, particularly the due dates and times, and then schedule the time you devote to this class accordingly.

The instructor reserves the right to drop students who have not participated in online work during one week of class and/or failure to turn in two assignments. The instructor can drop any student any time a student violates the written rules/requirements for remaining in good standing in the course.

Note: Exceptions may be made in the case of *extreme emergency* with supporting documentation. I will not accept ANY late coursework after one week from the originally scheduled due date during the semester or after the last scheduled coursework due date at the end of the semester. If you anticipate your assignment will be late due to unusual circumstances, please contact me and explain your situation prior to the due date of the assignment. Without prior notice, late assignments will NOT receive any credit.

*If BlackBoard is down and you cannot get into our course site to post work by the required due date:*

(1) you should call UTEP Helpdesk and report the problem; you should ask CASE NUMBER, and email it to Dr. Kosheleva (via regular email [olgak@utep.edu](mailto:olgak@utep.edu)). This information will help me to check with the Technology staff at UTEP regarding your problem.

(2) ALL coursework should be posted in our online course site. If you find that you are unable to log into Blackboard to access our course site at the time that you are trying to post your work by the due date, you must email me (through regular e-mail at [olgak@utep.edu](mailto:olgak@utep.edu)) IMMEDIATELY WITH AN ATTACHMENT OF YOUR WORK. When you do this, I will know that you have completed the work in a timely manner and it will be accepted, even though it was not posted in our course site as is generally required. If you email me indicating that you did not post your coursework because Blackboard is down, but you do not send me your work as an attachment in the message, you will not receive credit

4. Your work is expected to be your own. Everything you turn in for this course must be your own work. The purpose of coursework is to know what *you* think, how you can use your own words to explain your thinking. Any student caught engaging in instances of cheating, plagiarism or any other form of academic misconduct WILL be referred to the Dean of Students Office for disciplinary action. Students may be suspended or expelled from UTEP for such actions. It's serious! Don't do it.

## 5. **Deadline and Grading Policy**

1. The grades will be provided once every two-week period.
2. Please ensure that you carefully read all instructions for each assignment, particularly the due dates and times. Reading instructions is your responsibility and you should not assume due dates or times.
3. Keep electronic copies of all work submitted.

## 6. **Assignments**

1. LESSON ANALYSIS: you will examine and evaluate several STEM lessons (video observation). A handout will be provided to guide your analysis. (Individual work). Timeline: throughout the semester.
2. ANALYSIS of state and national standards related to STEM education. (Individual work). Timeline: throughout the semester.
3. CRITICAL LITERATURE REVIEW: Each student will draft a critical literature review on STEM education topics (Individual work). Timeline: throughout the semester.
4. ORGANIZING/FACILITATING INTERACTIVE DISCUSSIONS/PRESENTATIONS OF META LESSONS:  
Each group will be prepared to facilitate interactive discussions with students from the class. You will present your Meta lesson using interactive activities. Your role is to be "peer leaders",

that is while other students work in small groups, you will be providing content activities, and will help to maintain and encourage student interest and focus on conceptual understanding through a Socratic questioning dialog. You should also promote interaction within and among groups participated in content activities. The ultimate goal: by participating in hands-on activities, students will be actively constructing their own knowledge and deepen their understanding of mathematical concepts and procedures (group work).

**Timeline:** Specific schedule of Discussions and Presentations will be provided during second week of February.

5. INTERNET RESOURCES/PROGRAM EVALUATION: Use programs from the links provided or critique a program currently being used in the elementary and middle grades. Form for critique will be provided. (Group work).

Timeline: throughout the semester.

6. ELECTRONIC DATABASES: we will be using Electronic Databases from UTEP Library on a continuous basis. Make sure to become familiar with this wonderful resource. Part of every assignment would include some search in Electronic Database.

Timeline: throughout the semester. (Individual/Group work).

**Student Learning Outcomes:**

<b>COURSE SPECIFIC STANDARDS Students will be able to do</b>	<b>Measurements (means of assessment for student learning outcomes listed in first column)</b>
Compare and contrast empirical research and related theoretical perspectives of students development as they related to Inquiry-based pedagogy and early learning in the STEM domains	Class Participation; Discussions; Final Portfolio
Analyze the critical impact of both the physical environment and socio-cultural interactions/relationships on students' STEM conceptual development	Class Participation; Discussions; Final Portfolio
Outline STEM skills/practices and concepts development across different grades and academic subjects	Class Participation; Discussions; Final Portfolio
Outline STEM skills/practices and concepts development across different grades and academic subjects	Class Participation; Discussions; Final Portfolio
Apply Inquiry-based learning experiences to enhance STEM domain competencies	Class Participation; Discussions; Final Portfolio
Design developmentally appropriate STEM curricula for culturally and linguistically diverse learners	Class Participation; Discussions; Final Portfolio

## Evaluation & Coursework Requirements of Students:

### Coursework Requirements

Participation	150 Points
Weekly Discussion	300 Points
Finding and Explaining relevant articles	300 Points
Final Portfolio	250 Points

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 Total 1000Points

How Grades are Determined **Grade Earned Points** A 900 - 1000

B 800 - 890

C 700 - 790

D 600 - 690

F Below 60

**Class Schedule:** Please note that the schedule below is subject to change.

### Course Calendar

Date	Assignment
Week 1: January 27 <b>Face to Face</b>	<ul style="list-style-type: none"> <li>• Course Overview</li> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Introductory activity &amp; examination of syllabus</li> <li>• Presentation of course resources</li> </ul>
Week 2: Feb 3 <b>Face to Face</b>	<ul style="list-style-type: none"> <li>• Pre-test</li> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
Week 3: February 5 <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
Week 4: February 10 <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
Week 5: February 17 <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
Week 6: February 24 <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
Week 7: March 2 <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
Week 8: March 9 <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> </ul>
Week 9: March 16 <b>Spring Break</b>	<ul style="list-style-type: none"> <li>• No Classes</li> </ul>
Week 10: March 23 <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> </ul>



	<ul style="list-style-type: none"> <li>• Presentations</li> </ul>
<b>Week 11: April 6</b> <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
<b>Week 12: April 13</b> <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
<b>Week 13: April 20</b> <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Follow assignment guidelines (posted in OneDrive/BB)</li> <li>• Presentations</li> </ul>
<b>Week 14: April 27</b> <b>Face to Face/Online</b>	<ul style="list-style-type: none"> <li>• Final Presentations</li> </ul>
<b>Week 15: May 4</b> <b>Face to Face</b>	<ul style="list-style-type: none"> <li>• Final Presentations</li> </ul>

The course instructor reserves the right to adjust the course syllabus or change assignments as needed.