Class Time and Location: Tuesdays from 7:00 – 9:30, EDUC 102

Professor: Dr. Erin E. Turner
eturner@email.arizona.edu
Education Building, 719
Office phone: (520) 626-0085
Office hours: before class (5:30-6:30), by appointment

Required Course Texts (available in UA Bookstore):

Required Course Website:
1. d2l.arizona.edu (website will be used to post additional required readings, power point presentations, resources, assignment guidelines, and to submit all course assignments)

Other suggested texts for Teaching Math and Science for Social Justice:
2. Teaching about Climate Change: Cool Schools Tackle Global Warming. Available for $13.00 at www.teachingforchange.org
6. Rethinking our Classrooms: Teaching for Equity and Justice, volumes 1 and 2. Available at www.rethinkingschools.com
8. Math for a Change, and Math for a World that Rocks. Edited by K. Mistrik and R. Thul. Available by contacting Kevin Mistrik, Mathematics Teachers' Association, Loyola Academy, 1100 N. Laramie Wilmette, IL 60091, USA, E-mail: kmistrik@loy.org (847) 827-1361
Course Description
This course explores principles of equity, diversity and social justice in teaching and learning mathematics and science. The course will provide participants with a) an opportunity to expand their knowledge of issues of equity, diversity and social justice in the context of mathematics and science education; b) an opportunity to develop a pedagogical model for teaching for social change; c) a process to critically examine the content and the instructional practices of school mathematics and science from the perspective of equity and social justice; d) an opportunity to contemplate on the role of the teacher as an agent of change and “transformative intellectual.” Throughout the course we will emphasize the relationship between theory and practice in an attempt to understand some of the complexities and challenges in addressing issues of equity and social justice in mathematics and science teaching and learning.

Web Links related to issues of Equity and Social Justice in Education:
Chicago area Teachers for Social Justice  http://www.teachersforjustice.org/basics.html
Rethinking Schools  www.rethinkingschools.org
Teaching for Change  http://www.teachingforchange.org/
Center for Research on Education, Diversity & Excellence  www.crede.ucsc.edu
National Coalition for Equity in Education  http://ncee.education.ucsb.edu
National Center for Fair and Open Testing  http://www.fairtest.org
Radical Mathematics  http://www.radicalmath.org
The Algebra Project  http://www.algebra.org
Culturally Situated Design Tools (mathematics)  http://www.rpi.edu/%7Eeglash/csd.html
Ethnomathematics Digital Library  http://www.ethnomath.org
Society for the Advancement of Chicanos and Native Americans in Science  http://www.sacnas.org
Equity in Mathematics Education Leadership Institute  http://emeli.education.ucsb.edu/
Connecting Math to our Lives Project  http://www.orillas.org/math/announcement.html

Web Links related to issues of Equity and Social Justice in Society:
Center for Community Change  http://www.communitychange.org
Economic Policy Institute  http://www.epinet.org
United for a Fair Economy  http://www.faireconomy.org
Children’s Defense Fund  http://www.childrensdefense.org
Human Rights Watch  http://www.humanrightswatch.org
World Health Organization  http://globalatlas.who.int/
EPA Window on My Environment  http://www.epa.gov/enviro/wme/
Racial Profiling Analysis  http://www.racialprofilinganalysis.neu.edu/
Immigration and Migration Data  http://www.migrationinformation.org/

Web Links related to Math/Science Education:
National Council of Teachers of Mathematics  www.nctm.org
Math Forum  www.mathforum.com/teachers
Wisconsin Center for Education Research  www.wcer.wisc.edu
EQUALS, Lawrence Hall of Science, Berkeley  http://equals.lhs.berkeley.edu
COURSE POLICIES

1. Attendance / Participation
Attendance in the class is mandatory. Each class will involve discussion of the readings, mini-lectures, and in-class projects and activities. It is in your best interest to attend every class, and to participate actively. Classroom participation accounts for a portion of your grade. Students who miss more than one class (excused or unexcused) may not receive a grade higher than a B. I understand that emergencies come up and that you may have to miss a class. If that is the case, notify me as soon as possible (before the day you will miss) as to the reason you will miss class, and we can arrange for appropriate make-up work. Please be aware that excessive or unexcused absences will result in significantly lowering your grade, and/or dropping you from the class.

Note: All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

2. Grades / Late Assignments
Submitting ALL assignments on time will allow me to give you timely and helpful feedback. Grading will be based on the thought you put in your work, the critical thinking that you do, and whether or not you turn in the work on time. Late assignments will be docked points. Detailed instructions and/or grading rubrics will be supplied for each assignment.

3. Academic Integrity
Academic dishonesty will not be tolerated under any circumstances, and will result in a failure to pass this course. Misrepresenting the words or ideas of another as your own is called plagiarism. The key to avoiding plagiarism is to develop good judgment in the fair attribution of words and ideas. You must credit the source whenever you (a) directly quote the words of another or (b) reference a specific idea, argument, or fact from a given source. You should err on the side of caution and cite the source of any specific ideas (such as lesson plan ideas), concepts, or facts that you might use in a paper.

4. Disability Statement
The University of Arizona seeks to provide reasonable accommodations for all qualified individuals with disabilities. If you anticipate issues related to the format or requirements of this course, please meet with me. I would like us to discuss ways to ensure your full participation in the course. If you determine that formal, disability-related accommodations are necessary, it is very important that you be registered with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how to coordinate your accommodations.
ASSIGNMENTS

READING, ON-LINE DISCUSSION, IN-CLASS DISCUSSION

Reading and response is a critical portion of this class. It is critical that you read carefully before class, and come ready to discuss the readings. For each week, I have chosen several readings. Some may be from required course texts, and others will be posted as PDF files on D2L. In some instances, I may also post additional/optional readings that are designed to meet the diverse needs and interests of the students in our course.

ON-LINE DISCUSSION (D2L)
Beginning on the third class (September 4th) and continuing through class on November 20th, we will participate in a weekly on-line discussion of the readings. The purpose of this on-line discussion is to help you think carefully and critically about the readings before coming to class.

Each week, 2 students will serve as ON-LINE and IN-CLASS DISCUSSION FACILITATORS. Each facilitator will post a thought provoking question, burning issue or wondering related to the readings for that week on D2L. For the facilitators, questions are DUE by SATURDAY, at 12PM (noon). The “Facilitators” role is to a) get a discussion started, and b) facilitate the discussion once other students in the class start responding to the questions. The questions should be specific, thoughtful, engaging, and should reflect genuine questions/wondering/issues that you have based on the readings. Questions such as “What did you think about the reading?” or “How would you apply this in your classroom?” are not acceptable. Examples of good questions will be provided. Once other members of the class start responding to your questions (or other posts in the discussion forum) your job is to keep a discussion going by responding, posting follow-up questions, or commenting on posts that are particularly interesting. Each person will serve as an ON-LINE and IN-CLASS Discussion Facilitator 1 time during the semester.

Other students will read the initial questions, and any other posts submitted by their peers, and respond. You are each expected to be RESPONDERS 6 times during the semester (that means participating in 6 different discussions, not responding 6 times in one week). All discussion responses are DUE by TUESDAY, at 12 NOON. Late responses will not be accepted. Each response should be thoughtful, organized, and 1-2 paragraphs long. Comments such as “Yes, I agree!” do not count. Responses may address the initial question(s) posted by the facilitators, but may also include follow-up questions, or comments about other students’ postings. Responses should reflect a solid understanding of the readings, as well as your own ideas and experiences. As responders, you are encouraged to participate in the discussion more than once.

IN-CLASS DISCUSSION
As part of your role of DISCUSSION FACILITATOR, you will need to review all responses to the questions that you pose on D2L, and come to class prepared to a) share your thoughts about the discussion (a BRIEF 4-5 minute summary of key ideas in the
discussion), and b) to pose additional questions and/or ideas for us to consider/discuss in class. These additional questions may come from the on-line discussion (i.e., questions that were raised, but never really resolved, questions that came to mind as you read some of your peers posts, etc.). Alternatively, you might pose additional issues or ideas for us to consider as a class. You will be expected to start a discussion either in small groups or in a large group format.

Discussion Questions and responses will be graded according to the following criteria:
- Is the question/response thoughtful, clear, well written, and easy to follow?
- Does the question/response reflect a strong understanding of the readings?
- Is the question open ended and thought provoking enough to generate discussion?
- Does the response reflect the ability to apply core concepts of the readings to particular instructional settings?

**Dates for On-line and In-Class Discussion of the Reading:**
9/4, 9/11, 9/18, 9/25, 10/2, 10/9, 11/6, 11/13, 11/20

[Choose ONE date to be the facilitator, and SIX other dates to be a responder. This means you participate in a total of SEVEN different discussion forums, and skip TWO.]

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**“MATH TALK” OR “SCIENCE TALK” INTERVIEW**

In this assignment, you will interview three K-12 students about their beliefs, experiences, opinions, and ideas related to math OR science. The purpose of this interview to help you learn more about students’ perspectives on the disciplines, and how they see the purpose/function of the discipline in their own life, and in their school, family and community. We will generate a list of questions/prompts for this interview in class.

You may interview 3 students individually (each interview should only take 15-20 minutes) OR, you could conduct a “focus group” interview with a small group of students. Either method is fine, choose what works best for you. Focus group interviews will take longer (40 minutes) because you need to make sure each student has a chance to talk, BUT, they allow you to interview multiple students simultaneously. If you decide to use the focus group format, make sure your students are of similar ages. You may interview your own students, students you work with via a research project, or friends, family members or neighbors are also fine. Instead of K-12 students, you may choose to interview 3 parents, or 3 community members about their views related to math or science education.

While recording interviews is not required, if you have the ability to tape record, and if students are comfortable with tape recording, I HIGHLY recommend it. Taking notes is a learned skill, and it is difficult to take good, thorough notes the first time you conduct this kind of interview. If for any reason you cannot record the interview, please stop between each question to take notes. I would also suggest you bring some kind of recorder with
you, and then immediately following the interview, talk into the tape recorder and record everything that you remember about what the students said. Memory fades quickly!

After the interview, you will complete a short writing assignment (3 pages) summarizing what you learned by talking to the students. To prepare for writing this summary, you will need to carefully review the recording of the interview (or your detailed notes), and try to identify “big ideas” or “salient themes” that emerge from students’ comments. What ideas did they share? What general themes cut across their comments? What differences did you notice, and how might you account for those differences? What surprised you? What stood out as something particularly important that you want to remember? What implications do the students’ comments have for your own teaching? This is a summary, not a play by play of the entire dialogue. Grading rubrics and further details about the written portion of this assignment will be provided in class.

Interview Write-Up Due: September 25th

SHORT RESEARCH PAPER RELATED TO EQUITY, DIVERSITY and/or SOCIAL JUSTICE in MATH or SCIENCE EDUCATION (individual assignment)

Scholarly Research Paper  (target length: 12-15 pages)

For this option, you will select a particular topic/issue related to issues of equity and social justice in math or science education. Your topic may build upon a topic that we explored in class, or it may explore a different area of education for social justice that was not included in our syllabus. Example topics include: teaching algebra for equity and justice, curricula related to issues of environmental racism, gender inequity in math/science education, high stakes testing and accountability systems and implications for social justice, the No Child Left Behind Act and implications for issues of equity and social justice, advancing social justice through supporting parent engagement in math/science, ethnomathematics of a particular cultural group, culturally relevant math/science with a particular cultural group, equitable classroom practices in math/science education, supporting ELLS students in math/science education, preparing math/science teachers to teacher for social justice, etc… The idea is for you to choose a topic that is of genuine interest to you.

Once you chose a topic, you are expected to conduct significant additional reading related to your topic: 5-8 research-based articles. If relevant, you may also include articles and book chapters that you read for the course, but these will NOT count as part of your 5-8 additional sources. You will then synthesize your findings in a coherent, well structured review of the literature. You will end your literature review with a discussion of implications for teaching, and/or for future research.

You will submit a proposal for this paper early in the semester. The proposal will consist of a one paragraph summary of your chosen topic, a one paragraph rationale for why you selected that topic, and a list of 2-3 research based articles that you plan to read. Later, you will submit an annotated bibliography that briefly summarizes FIVE of the articles
that you read for your paper, and that outlines how each article relates to the focus of your paper. Additional details to be provided in class.

Proposal for Scholarly Paper Due: September 18th
Annotated Bibliography for Scholarly Paper Due: October 9th
Final Scholarly Paper Due: November 6th

CURRICULUM DESIGN PROJECT (individual or small group assignment)

Curriculum Design Project (1-3 members per group)

For this project, you will outline a curricular unit that uses a particular social, economic, educational or political issue to teach a set of mathematics or science concepts. You might start with an “issue” – one from the local community, from the school, or even a more global issue that impacts our state/nation/world. Then, you can identify math/science concepts that would help students to investigate and possibly act upon this issue. Alternatively, you might start with a set of math/science concepts that you want to teach, and then determine a real-world issue/context that would help students to explore these concepts.

Sample Issues Might Include:

- **Social/Community**: immigration, racial profiling, poverty, media bias, community resources (or lack of resources) such as parks, recreation centers, etc., affordable housing, population growth, child labor
- **Education**: testing, access to qualified teachers, access to AP coursework, resources, play space at the school, funding, achievement gaps, bias in curricular materials (books, posters, etc.), bilingual education
- **Economic**: poverty, minimum/living wage, taxes, public transportation costs, loans, housing, government spending (education budget, war budget), sweat shops (money earned by workers as compared to money earned by corporations), bank accounts, credit cards, disparities in pay, etc..
- **Health**: diabetes, AIDS, funding for research, asthma (environmental irritants), smoking/drugs (marketing, profits), access to health insurance, access to healthy school lunches (analysis of nutritional value)
- **Environmental**: water quality, air quality, pollution, destruction of habitats, hazardous waste sites, trash and recycling
- **Cultural**: mathematical and/or scientific practices and contributions of a specific cultural group (numeration systems, architecture, healing/medicinal practices, scientific knowledge, measurement in time and space, games and puzzles, etc.)

Your curricular unit will have several components, including a) an overview and rationale for the unit, b) a description of the core math/science ideas addressed, c) a description of the student population the unit is intended for, d) a description of and background information about the “issue” that the unit address, e) the lessons, games and/or activities. While you are highly encouraged to draw on existing resources and data sources in developing your unit, your unit must make a new, unique contribution to the
field. You will present sample activities from your unit to your peers. More details to be provided in class.

*Proposal for Curriculum Project Due: on or before October 30th*
*Final Curriculum Project Due: December 4th or 11th*
*Class Presentation of Project: December 4th or 11th*

### OVERVIEW OF ASSIGNMENTS, DUE DATES, AND GRADING

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<thead>
<tr>
<th>Assignment</th>
<th>Due Date</th>
<th>Percent of Grade</th>
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<tbody>
<tr>
<td><strong>Attendance and Participation</strong></td>
<td>ONGOING</td>
<td>10</td>
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<tr>
<td>(includes participation in class discussions of readings)</td>
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<tr>
<td><strong>On-line/In-class Discussion of Readings</strong></td>
<td>Sept 4th, 11th, 18th, 25th Oct 2nd, 9th Nov 6th, 13th, 20th</td>
<td>15</td>
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<tr>
<td>Discussion Facilitator (1 time)</td>
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<td>Discussion Responder (6 times)</td>
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<td><strong>Math/Science Talk Interview</strong></td>
<td>September 25th</td>
<td>10</td>
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<tr>
<td><strong>Scholarly Research Paper</strong></td>
<td>Proposal: Sept 18th Bibliography: October 9th Final: November 6th</td>
<td>32</td>
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<tr>
<td>- proposal for paper</td>
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<td>- annotated bibliography</td>
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<td>- final paper</td>
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<tr>
<td><strong>Curriculum Project</strong></td>
<td>Proposal: October 30th Final Project: Dec 4th or 11th Presentation: Dec 4th or 11th</td>
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<tr>
<td>- proposal for project</td>
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<td>- final curriculum project</td>
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<td>- in class presentation</td>
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## COURSE SCHEDULE

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings Due</th>
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<tbody>
<tr>
<td><strong>August 21st</strong></td>
<td>Introduction to the Course</td>
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<td></td>
<td>- Introductions</td>
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<td>- Core Ideas of the Semester</td>
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<td></td>
<td>- What do we mean by equity, diversity, justice in math/science education?</td>
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<td></td>
<td>Assignments Due:</td>
<td>NONE</td>
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<tr>
<td><strong>September 4th</strong></td>
<td>Intro to Issues of Equity and Social Justice in Science Education</td>
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<td>Readings Due:</td>
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<td></td>
<td>Assignments Due:</td>
<td>ON-LINE discussion of Readings (#1)</td>
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</table>
Sept 11th: Perspectives on Equity: Culture, Identity & Context in Math Education

Readings Due:


Assignments Due: ON-LINE discussion of Readings (#2)

Sept 18th: Perspectives on Equity: Culture, Identity & Context in Science Education

Readings Due:


Assignments Due: ON-LINE discussion of Readings (#3)
Proposal for Scholarly Research Paper
Sept 25th: Perspectives on Equity: Youth/Family/Community Funds of Knowledge

Readings Due:


SUGGESTED additional reading:

Assignments Due:  
ON-LINE discussion of Readings (#4)  
Math or Science Interview Write-Up

Oct 2nd: Critical Pedagogy in Math/Science Education: Foundations

Readings Due:


Assignments Due: ON-LINE discussion of Readings (#5)
Readings Due:

MATH FOCUS:


SCIENCE FOCUS:


Assignments Due:  ON-LINE discussion of Readings (#6)
Annotated Bibliography for Scholarly Research Paper

October 16th: Critical Pedagogy in Math/Science Education: Example Projects

Readings Due:

MATH FOCUS:


**SCIENCE FOCUS:**


D2L: Gleason, C. & Novak, A. (2004). Water Quality Project (technology enhanced project-based science unit on water quality in a local stream). Also see information on this water quality unit at: [http://www.letus.org/water.htm](http://www.letus.org/water.htm)

Assignments Due: NONE

**OCT 23rd:** NO CLASS MEETING (work on research paper/curriculum project)

**OCT 30th:** NO CLASS MEETING (work on research paper/curriculum project)

Assignments Due: Proposal for Curriculum Project
Nov 6th: Perspectives on Equity in Math/Science: Equitable Classroom Practices

Readings Due:


Assignments Due: ON-LINE discussion of Readings (#7)
Final Scholarly Research Paper

Nov 13th: Perspectives on Equity in Math/Science: Issues related to Language

Readings Due:


Assignments Due: ON-LINE discussion of Readings (#8)
November 20th: Perspectives on Equity in Math/Science: Issues related to Gender

Readings Due:


Assignments Due: ON-LINE discussion of Readings (#9)

November 27th: Perspectives on Equity in Math/Science: Issues related to Testing

Readings Due:


Assignments Due: NONE

DECEMBER 4th: FINAL PROJECT PRESENTATIONS: Part I

Assignments Due: Curriculum Project and Class Presentation (if you present today)

December 11th: FINAL PROJECT PRESENTATIONS: Part II

Assignments Due: Curriculum Project and Class Presentation (if you present today)