

**Syllabus**  
 Fall 2013

<b>Date/Time: M,W,F 2.30 - 3.20</b>	<b>Section Number: 48483</b>
Professor: Dr. Susan E Riechert 520 Hessler (rieichert@utk.edu)  Instructor: Dr. Theresa Hopkins 602 Greve Hall (thopkins@utk.edu)	Instructor: Nivedita Ganguly 603 Greve Hall (nganguly@utk.edu)  Office Hours: By appointment- Send email with three suggested meeting times.

**Course Topic for Fall 2013 Section # 48483: History and Philosophy of Science and Mathematics**

Class	Topic
Topic 1	Course Orientation
Topic 2	What Is Science? What Is Mathematics?
Topic 3	Pythagoras
Topic 4	Plato's Philosophy of Mathematics
Topic 5	Species, Monsters and Things In-between
Topic 6	Darwin's Path to Evolution
Topic 7	Questions and Evidence on Evolution
Topic 8	Paradoxes of Division
Topic 9	Irrational Numbers
Topic 10	Minus Times Minus is What?
Topic 11	Radical Puzzles
Topic 12	Secret of Alchemists
Topic 13	Impossible Chemistry
Topic 14	Discovery of the Electron
Topic 15	Infinitely Small
Topic 16	The Age of the Earth
Topic 17	Wegener and Continental Drift
Topic 18	Non-Euclidean Geometry
Topic 19	Prisoners of Probability
Topic 20	Revolutions in Astronomy
Topic 21	Eugenics
Topic 22	Mendel
Topic 23	Relativity
Topic 24	Philosophies of Math: Choose or Sleepwalk
Topic 25	The Big Picture: History in Science and Math Classrooms

## Course Description

This upper-division perspectives course explores a selection of topics and episodes in the history of science and mathematics. The specific objectives and expectations in the table following this section are part of four broad, interlocking goals:

- to provide upper division students with an overview of the history of science and mathematics;
- to enable students in the *VolsTeach* minor to put these historical perspectives and context to work in pedagogy;
- to promote intellectual curiosity and sharpen student's critical thinking skills; and
- to improve student presentation and especially, writing skills.

As one requirement of this writing intensive course, students will design and prepare two class lesson plans of 2,000 words each. You will select the subject of these lesson plans from a variety of options. Formal presentation of one of the two lesson plans will be made to the class. All students will participate in critiquing the presentations of others.

Class quizzes in short essay format and a midterm essay exam will test the extent to which students have followed, engaged, and learned from the topics discussed in class, as well as from assigned readings. A final exam will be given (insert date) that will primarily cover material from the second half of the course with the inclusion of some material from the midterm exam.

The assigned readings for this course vary in length, and you are encouraged to read thoughtfully in all cases. Lightly skimming the material will not adequately prepare you for the level of critical thinking and engagement you are expected to display in class discussions. Some of the readings are from primary sources (such as writings by prominent scientists), other readings are from secondary texts (such as by historians). You are also required to do additional research and reading to inform your lesson plans. (Keep this in mind when budgeting your time for this course.)

Classes are conducted as a mixture of lecture and discussion. Accordingly, attendance and participation are important, as you can see from the grading distributions, below. Attendance will be taken daily, and will be used in evaluating your overall grade for class participation. You are encouraged ask questions at any time during lectures, as well as to speak up and offer thoughts, ideas, and opinions during class discussions.

## Expectations

1. Everyone is expected to attend class. You have one free absence without consequences. After that you must provide written medical proof of illness, or another acceptable exemption, otherwise, you will lose .5 percentage points for each absence.
2. Alongside the present syllabus, you should soon have a handout titled "Honor Statement with Incorporation of Plagiarism Policy" which has been prepared by the University of Tennessee. Accordingly, university policies on plagiarism and academic dishonesty will be enforced in this class.
3. In addition to the two textbooks listed below, several additional readings will be required. Those articles, or links to the articles, will be available on our course Blackboard site.
  - a. *The Cult of Pythagoras: Math and Myths* by Alberto A. Martinez (ISBN 978-0822944188)
  - b. *Science Secrets: The Truth about Darwin's Finches, Einstein's Wife, and Other Myths* by Alberto A. Martinez (ISBN 978-0822944072)

**Course Objectives and Evidence of Student Learning and Engagement**

<i>Students will...</i>	<i>Evidence</i>
<b>Describe the historical development of aspects of science and mathematics relevant to future teachers.</b>	Reading confirmation quizzes Participation in class and weekly section discussions Mid-term and final essay exam responses
<b>Describe several analytic frameworks for understanding the history of science and mathematics.</b>	Reading confirmation quizzes Participation in class and weekly section discussions Mid-term and final essay exam responses
<b>Analyze the history and content of evolutionary theory.</b>	Reading confirmation quizzes Participation in class and weekly section discussions Written responses to questions high school students are likely to raise about evolution Mid-term and final exam responses Lesson plan
<b>Express ideas and opinions clearly and effectively in formal writing.</b>	Two 2,000 word Lesson plans Various writing assignments and essay quizzes & exams
<b>Develop skills in searching for, retrieving, and evaluating the provenance and reliability of, source materials, on- and offline, including specific resources available to teachers.</b>	Participation in class and weekly section discussions Research skills workshop with university librarian 5E lesson plan citations
<b>Integrate approaches and material learned in the course with independent research and science or math content to design middle and high school science and math lessons</b>	Two 5E lesson plans designed for middle or high school students that address standards and integrate approaches and material learned in the course with independent research and science or math content. Teaching 5E lesson plan to peers Feedback to peers on 5E lessons
<b>Reflect on and critique their own work, particularly lesson plans, and that of others.</b>	Two 5E lesson plans designed for middle or high school students that address standards and integrate approaches and material learned in the course with independent research and science or math content. Teaching 5E lesson plan to peers Feedback to peers on 5E lessons

**Assignments/Grading Policy**

Activities	Points
<b>Class Participation and Attendance.</b>	10
<b>Reading Confirmation Quizzes. There will be short quizzes each day for any reading assignments.</b>	16
<b>First Lesson Plan.</b>	16
<b>Midterm Exam.</b>	16
<b>Second Lesson Plan.</b>	16
<b>Presentation.</b>	10
<b>Final Exam. This is a comprehensive final in essay format, sampling from all that we have talked about.</b>	16
<b>TOTAL</b>	<b>100</b>

### Grading Scale

% of Points	Grade	Quality of Work
<b>93-100, 90-92</b>	A, A-	<b>Exemplary:</b> All aspects of the work are complete and well ABOVE the minimum level specified. Well written and free of typographical and grammatical errors. Application of concepts presented in class. Evidence of careful thought and reflection. Reflective application of assignment to future teaching and learning.
<b>87-89, 83-86, 80-82</b>	B+, B, B-	<b>Well done:</b> Two or more of the above elements missing or of lesser quality.
<b>77-79, 73-76, 70-72</b>	C+, C, C-	<b>Acceptable:</b> The task was completed at the minimum level specified. Most aspects of the assignment indicated a focus on task completion as opposed to careful reflection, analysis, and/or application.
<b>67-69, 63-66, 60-62</b>	D+, D, D-	<b>Not acceptable:</b> Several aspects of the assignment are missing or completed at a sub-standard level.
<b>59 or below</b>	F	<b>Failing:</b> Assignment not completed.

#### Late Work Policy:

Work turned in late without an extension negotiated at least a week in advance will be penalized one full letter grade.

#### Students with Disabilities:

Please contact the Office of Disability Services (ODS), 974- 6087, or find information at the <http://ods.utk.edu/> for all questions regarding academic or accessibility accommodations requests.

#### UT Policy on Scholastic Dishonesty:

Students who violate university rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced.

#### Timetable Calendar for Fall 2013

Classes Begin . . . . .	August 21, 2013
Last Day to Final Register, Add, Change Grading Options or Drop w/o a "W". . . . .	August 30, 2013
Labor Day (No Classes) . . . . .	September 2, 2013
Fall Break (No Classes) . . . . .	October 17-18, 2013
Last Day to Drop with a "W" - Full Term Courses . . . . .	November 12, 2013
Thanksgiving Holidays (No Classes) . . . . .	November 28-29, 2013
Classes End (Full and Second Session) . . . . .	December 3, 2013
Study Day . . . . .	December 4, 2013
Exam Period . . . . .	December 5, 6, 9, 10, 11, 12 2013