

# COURSE SYLLABUS

## **EDU 919: Women in Mathematics and Science**

**Instructor: Wilbert Reimer**

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Number of Units: 3 Semester Units

Grade Level: 3-12

### **Course Description**

In recent years, many individuals and organizations in the United States have worked hard to ensure that women have the same opportunities for education, for professional careers, and for advancement in their careers as men. Two of the fields in which women have been little represented are mathematics and science.

In fact, it is possible to read the histories of mathematics and science and find little mention of women, although many have made important contributions. Who were those few who did succeed? Why were there so few? What were the barriers they faced, barriers that some men of lesser ability did not have to surmount?

This course, designed for teachers of grades 3 through 12, offers an enticing study of the contributions of women to mathematics and science. Too often we assume these areas are solely the domain of men, but women have made significant marks in these fields as well. Participants in this course will be inspired by what women have achieved and by the ways they often overcame obstacles and prejudice in the pursuit of excellence.

The Common Core State Standards for Mathematics and the five core propositions of the National Board for Professional Teaching Standards have provided the guiding principles and philosophical basis for this course.

### **Course Dates:**

This course is self-paced; students may enroll at any time and take up to a year to complete assignments. No course should be completed in less than three weeks (one week per credit).

## **Course Materials**

**Text (Included):** Yount, Lisa. *A to Z of Women in Science and Math*.  
New York: Facts on File, Inc., 2008.

Included in the course folder is an appendix of supplementary materials and resources. Information about Fresno Pacific University, the Center for Professional Development, and the instructor, plus details on course policies and procedures is also provided.

## **Course Requirements**

To complete this course satisfactorily, participants must submit

1. List of text readings (30).
2. List of organizations (three).
3. Essay on gender equity.
4. Fact sheets (five).
5. Reports of three classroom activities designed to share information about women mathematicians or scientists.

See the "Schedule of Topics and Assignments" for more details on these assignments and for summer or "off-track" alternatives.

All work should be typed and sent to the instructor at one time when the course is completed. Please make a copy of all work; work will not be returned. Students have one full year to finish the course but should not send completed work in less than three weeks from registration.

**Send completed work by email attachments to: [wreimer@fresno.edu](mailto:wreimer@fresno.edu)**

**OR**

**Mail all the above items to:**

Wilbert Reimer  
1549 S. Lind Avenue  
Fresno, California 93727

**IN EITHER CASE, request online grading: <http://ce.fresno.edu/cpd>**

## **National Standards:**

Appropriate for this course, the following descriptions of proficient students are drawn from the Common Core Standards.

### **1. They Come to Understand Other Perspectives and Cultures.**

Students appreciate that the twenty-first-century classroom and workplace are settings in which people from often widely divergent cultures and who represent diverse experiences and perspectives must learn and work together. Students actively seek to understand other perspectives and cultures through reading and listening, and they are able to communicate effectively with people of varied backgrounds. They evaluate other points of view critically and constructively. Through reading great classic and contemporary works of literature representative of a variety of periods, cultures, and worldviews, students can vicariously inhabit worlds and have experiences much different than their own.

### **2. They Build Strong Content Knowledge.**

Students establish a base of knowledge across a wide range of subject matter by engaging with works of quality and substance. They become proficient in new areas through research and study. They read purposefully and listen attentively to gain both general knowledge and discipline-specific expertise. They refine and share their knowledge through writing and speaking.

### **3. They Produce Clear and Coherent Writing.**

Students produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. Students will use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

### **4. They Conduct Short As Well As More Sustained Research.**

Students will create projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

### **5. They Gather Relevant Information From Multiple Sources.**

Students will gather relevant information from authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

## **National Board for Professional Teaching Standards: Five Core Propositions**

In addition to the content standards referenced above, this course supports the following core propositions that characterize National Board Certified Teachers (NBCTs).

### **Proposition 1: Teachers are Committed to Students and Their Learning**

- NBCTs are dedicated to making knowledge accessible to all students. They believe all students can learn.
- They treat students equitably. They recognize the individual differences that distinguish their students from one another and they take account for these differences in their practice.
- NBCTs understand how students develop and learn.
- They respect the cultural and family differences students bring to their classroom.
- They are concerned with their students' self-concept, their motivation and the effects of learning on peer relationships.

### **Proposition 2: Teachers Know the Subjects They Teach and How to Teach Those Subjects to Students.**

- NBCTs have mastery over the subject(s) they teach. They have a deep understanding of the history structure and real-world applications of the subject.
- They have skill and experience in teaching it, and they are very familiar with the skills gaps and preconceptions students may bring to the subject.
- They are able to use diverse instructional strategies to teach for understanding.

### **Proposition 3: Teachers are Responsible for Managing and Monitoring Student Learning.**

- NBCTs deliver effective instruction. They move fluently through a range of instructional techniques, keeping students motivated, engaged and focused.
- They know how to engage students to ensure a disciplined learning environment, and how to organize instruction to meet instructional goals.
- NBCTs know how to assess the progress of individual students as well as the class as a whole.
- They use multiple methods for measuring student growth and understanding, and they can clearly explain student performance to parents.

### **Proposition 4: Teachers Think Systematically about Their Practice and Learn from Experience.**

- NBCTs model what it means to be an educated person—they read, they question, they create and they are willing to try new things.
- They are familiar with learning theories and instructional strategies and stay abreast of current issues in American education.
- They critically examine their practice on a regular basis to deepen knowledge, expand their repertoire of skills, and incorporate new findings into their practice.

### **Proposition 5: Teachers are Members of Learning Communities.**

- NBCTs collaborate with others to improve student learning.
- They are leaders and actively know how to seek and build partnerships with community groups and businesses.
- They work with other professionals on instructional policy, curriculum development and staff development.
- They can evaluate school progress and the allocation of resources in order to meet state and local education objectives.

## **Learning Outcomes:**

### **Participants in this course will be able to**

1. recognize and analyze the issues related to gender inequity in mathematics and science. (CCSS 1, 2, 4, & 5; NBPTS Props 1, 2, 3, 4, & 5)
2. identify and discuss some of the great woman mathematicians and scientists and share information about their contributions. (CCSS 1, 2, 4, & 5; NBPTS Props 1, 2, 3, 4, & 5)
3. confidently use a variety of approaches to implement history into the classroom and be better prepared to design activities for classroom use. (CCSS 2, 3, 4, & 5; NBPTS Props 2, 3, 4, & 5)
4. demonstrate the importance of teaching mathematics and science from a historical perspective. (CCSS 1, 2, 4, & 5; NBPTS Props 1, 4, & 5)
5. discover how the activities are connected to a standards based curriculum. (NBPTS Prop 5)

## Schedule Of Topics And Assignments

1. Select and read at least thirty (30) entries from the text. Submit a list of entries read.
2. Research and identify at least three agencies or organizations promoting girl's or women's involvement in mathematics and/or science. List these organizations and briefly describe their areas of emphases.
3. Write a brief essay (350-500 words) describing the current status of gender equity in mathematics and science, either in the U.S. or on the global scale. What are the reasons for the imbalance, and what can or should be done to correct it?
4. Compile five "fact sheets" about women you find especially interesting or relevant to your teaching. You may use any format for recording information, incorporating technology as appropriate.

Each "fact sheet" should include the following information:

- a. Name
- b. Date of birth
- c. Date of death
- d. Nationality
- e. Family background and childhood
- f. Education
- g. Obstacles: What do you think was the biggest problem she had to overcome? How did she face this challenge?
- h. Contributions to mathematics and/or science
- i. What did you like best about her story?
- j. What values or beliefs did this woman demonstrate that you admire or find interesting?
- k. What anecdote(s) might your students enjoy hearing?

Feel free to incorporate additional information from sources other than the text. Utilize books, periodicals, and the Internet to learn more about the contributions of these important women.

5. Design and "teach" three activities that share information about women mathematicians and scientists. You may use activities from a convenient resource or create your own. See the list of "Suggested Connecting Activities" in the appendix. Be imaginative as you design a learning experience likely to engage your students.

While you may create a standard lesson for your class, you may also choose to develop a power point presentation or build a bulletin board display, for example. It is NOT necessary to take class time to fulfill this assignment.

Report on these three activities using the following guide:

- a. Grade level
- b. Activity used
- c. Lesson objectives
- d. Outline of presentation procedures
- e. Student response to information (informal analysis/summary)
- f. State or national standards (mathematics or science) addressed

**NOTE: If you are not currently teaching or are unable to fulfill the activity portion of this syllabus, you may compensate by preparing the activities in #5 for later use. Then, initiate a discussion with a colleague about the importance of including female mathematicians and scientists in the curriculum and write a brief (150-200 words) summary of your conversation.**

## **Evidence of Learning**

- 1) Student demonstrated evidence of understanding course objectives and critical thinking skills through reflective writing assignments. (Outcomes 1 & 2; Assignments 1, 2, & 3)
- 2) Student demonstrated evidence of understanding course objectives through presentation of lesson plans and projects. (Outcomes 1, 2, 3, & 4; Assignment 5)
- 3) Student demonstrated openness towards and creative use of a variety of learning methodologies and strategies. (Outcomes 3 & 4; Assignment 5)
- 4) Student demonstrated an understanding of appropriate hands-on methods of teaching through classroom activities. (Outcome 3; Assignment 5)
- 5) Student made connections to his or her state content and/or professional teaching standards. (Outcome 5; Assignment 5)

## **Grading Policies and Rubrics**

Grades will be determined using the following percentages:

1. List of text readings - 10%
2. List of organizations - 15%
3. Essay on gender equity - 20%
4. Fact sheets - 25%
5. Reports of three classroom activities designed to share information about women mathematicians or scientists - 30%

Coursework is to be typed. Follow course instructions carefully.

Total scores determine the final grade:

90 - 100% = A

80 - 89% = B

79% or below = no credit

All coursework must reflect a minimum "B" quality to receive credit.

Participants may request either a letter grade (A or B) or credit (Cr). Every person with a score of 80% or above will receive three semester units of credit.

## Scoring Rubric

Type of Assignment	90 – 100 points Exceptional	80 – 89 points Adequate	70 – 79 points Not Acceptable
Written responses	Student's written responses show an exceptional investment of time, energy and thoughtful reflection. The work submitted by the student is original and thorough. The student effectively organizes key insights and demonstrates evidence of interaction with the texts and exercises.	Student's written responses show an adequate investment of time, energy and thoughtful reflection. The work submitted by the student is complete, but lacks thoroughness and originality. The student sufficiently organizes insights and demonstrates evidence of interaction with the course activities.	Student's written responses show little investment of time, energy and thoughtful reflection. The work submitted by the student does not show adequate thought or effort.
Lesson Design	Lesson plans show an exceptional investment of time, energy and thoughtful reflection. Student consistently makes connections to local instructional goals/standards and implements research-based strategies and approaches.	Lesson plans show an adequate investment of time, energy and thoughtful reflection. Student makes some connections to local instructional goals/standards and research-based strategies and approaches.	Lesson plans submitted by the student do not show adequate thought or effort, and may not address specific goals.
Lesson evaluations	Student includes the use of critical thinking and reflection in the evaluation of lessons implemented.	Student includes the use of reflection in the evaluation of lessons implemented, but may lack sufficient detailed analysis.	Student does not demonstrate critical thinking or reflection in the evaluation of lessons implemented.
Presentation	Student effectively organizes key insights into a thoughtful and well-structured presentation.	Student includes several key insights in a presentation.	Student presentation lacks key insights.
Research	Research accesses multiple sources available via the internet. Web descriptions demonstrate thorough engagement with site information.	Research accesses sources available via the internet. Web descriptions demonstrate adequate engagement with site information.	Research fails to access sources available via the internet. Web descriptions demonstrate little engagement with site.

## **Instructor/Student Contact**

Students are warmly invited to contact the instructor at any time with concerns, questions, or comments related to course work. They are specifically asked to do so after finishing Assignment #1. At the completion of the course, the instructor will comment on the student's work and make suggestions, if needed.

## **Policy on Plagiarism:**

All people participating in the educational process at Fresno Pacific University are expected to pursue honesty and integrity in all aspects of their academic work. Academic dishonesty, including plagiarism, will be handled according to the procedures set forth in the Fresno Pacific University Catalog.

## **University Information**

Graduate level course work reflects Fresno Pacific University's Desired Student Learning Outcomes as it applies to professional development to demonstrate the following:

- Oral and written communication in individual and group settings
- Content knowledge, and application of such knowledge in the student's area of interest to affect change
- Reflection for personal and professional growth
- Critical thinking
- Computational/methodological skills to understand and expand disciplines, including an understanding of technological systems