Syllabus: Math 2010S (previously Math 2194)
Intersections of Mathematics and Society: Hidden Figures

Spring 2020

Instructors

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Meeting Times and Locations

Lecture

Monday, Wednesday, and Fridays 11:30am-12:25pm

Service Learning

TBD (around the fifth or sixth week of the semester) Columbus Metropolitan Library Branches

Hidden Figures Revealed Showcase

(Tentatively) Monday, April 20, 2020 from 6:00 pm – 7:30 pm
Mathematics Tower Room 724

Course Description

In this course we will critically examine the intersections of race, gender, and mathematics as it relates to the accomplishments of the African-American mathematicians featured in the book *Hidden Figures: the American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race* by Margot Lee Shetterly. In particular, we will contextualize the historical climate in which these accomplishments occurred and analyze how mathematics and the advancement of American society were intertwined from World War II to the Space

Race. Finally, we will focus on understanding the mathematical tools used by human computers and scientists at Langley during pre and post-World War II.

Course Goals

The main learning goals for the course included below will influence the Portfolio, Final Project, the Mini-Projects, quizzes, reflections, and course discussions.

Goal 1. Exposure to different careers in the mathematical sciences.
Goal 2. Understand historical and contemporary mathematical tools and ideas.
Goal 3. Critically examine the relationship between mathematical innovation, technological advancement, and society.
Goal 4. Use intersectionality as a framework to critically examine how the intersections of race, gender, and socioeconomic status influence access to mathematical communities and opportunities in STEM.
Goal 5. Effectively communicate mathematics to an audience of varying ages and mathematical backgrounds.
Goal 6. Make connections between concepts and skills learned in class and service-learning activities.
Goal 7. Demonstrate an understanding of the mathematical communities in which service-learning activities take place.
Goal 8. Reflect on the impacts of mathematical outreach.

Course Materials

Required Text

Hidden Figures: the American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race by Margot Lee Shetterly, ISBN: 978-0-06-236359-6

Available for purchase at Barnes & Noble or Amazon and other book sellers

Suggested Text

Power in Numbers: Rebel Women in Mathematics by Talithia Williams, ISBN 978-1631064852

Available for purchase at Barnes & Noble or Amazon and other book sellers

Course Prerequisites

A grade of C- or above in Math 1148 and Math 1149; or a grade of C- or above in Math 1150; or credit for Math 150; or Math Placement Level L.

Grading

Assignment Category	Percentage of Final Grade
Hidden Figures Project	30%

Mini-Project	15%
Worksheets	10%
Communication	15%
Service-Learning Portfolio	10%
Service-Learning Reflections	10%
Discussion Posts/Quizzes	10%
Total	100%

Hidden Figures Project

The final project will be broken into three components with all three components totaling 30% of the course grade. These components will be included in the final portfolio to be submitted at the end of the semester. A more detailed description of each component can be found in the table below. Complete rubrics for these projects will be made available throughout the course.

Part	Percentage	Description
I. Hidden Figure Analysis	10%	In this project students will describe how their research figure meets the criteria of being a hidden figure using intersectionality as a framework for their discussion.
II. Mathematical Description	10%	In this project students will describe the mathematical tools used by their hidden figure. Students should also research connections between these modern tools and their historical roots. In addition, student will describe the relevance of the work being done by the hidden figure to their company and/or society at large.
III. Presentation	10%	The first two parts of the research project will culminate in a final in-class presentation during the last two weeks of class and a poster presentation at the Hidden Figures Showcase.

Mini-Projects

There will be two mini-projects throughout the semester, each worth 12.5% of the course grade. These mini-projects will focus on examining a mathematical tool that was integral to the advancements related to the Space Race discussed in the Hidden Figures text. Mini-Project 1 will focus on a mechanical tool, the slide rule, while Mini-Project 2 will focus on an analytical tool, the geometry involved in orbital flight.

Worksheets

Throughout the semester there will be tightly focused worksheets covering mathematical material related to mathematical tools, the Hidden Figures text, and the historical context.

Communication

The communication grade will be based on presentations given at the various CML branches, attendance, and meaningful contributions to in-class discussion.

Service-Learning Portfolio

The end of course assignment will be a Service-Learning Portfolio worth 10% of the course grade and turned in during finals week. The portfolio will be comprised of reflections from the service-learning activities, STEM programming materials from the service-learning with CML, and documents from the Hidden Figures Project. Thus, the portfolio will reflect a polished version of the major course assignments throughout the semester. In addition, students will write a cover letter for the portfolio that prompts them to reflect on the mathematical communities we study in class and the mathematical communities they are creating with their service activities in the CML branches.

Service-Learning Reflections

There will be multiple reflection activities throughout the semester in order to connect the service-learning activities with the content covered during class. Each short reflection will typically be 1 to 2 pages in length.

Discussion Prompts/Quizzes

There will be quizzes and discussion prompts. The quizzes will be based on the readings and weekly course topics. The discussion prompts will be one-page responses to inspired by different themes explored throughout the course.

Percentage Grading Scale

A	**A-**	**B+**	**B**	**B-**	**C+**	**C**	**C-**	**D+**	**D**	**E**
[100, 93)	[93, 90]	(90, 87]	(87, 83]	(83, 80]	(80, 77]	(77, 73]	(73, 70]	(70, 67]	(67, 60]	< 60

Tentative Course Schedule

Week	**Date**	**Topic**	**Assignments/Events**
1	1-6-20	Introduction to Course	
	1-8-20	Introduction to Hidden Figures Story	Reading Quiz 0 Due
	1-10-20	**Introduction to Service-Learning with CML**	Perceptions of Mathematics Survey Due
2	1-13-20	When Computers Were Human	Hidden Figure Project: Subject Ranking Survey Due; Reading Quiz 1 (HF Ch.1,2,3,4) Due
	1-15-20	Introduction to Intersectionality	Discussion Prompt 1 Due
	1-16-20		Discussion Prompt 1 Response to Classmates Due
	1-17-20	Intersectionality in the Hidden Figures Story	Service-Learning Reflection 1 Due

3	1-20-20	No Class: Martin Luther King Jr. Day	
	1-21-20		Reading Quiz 2 (HF Ch.5,6) Due
	1-22-20	Mathematical Tools: Introduction to Slide Rules 1 (of 2)	Hidden Figures Project: Interview Questions Due; Discussion Prompt 2 Due
	1-23-20		Discussion Prompt 2 Response to Classmates Due
	1-24-20	Mathematical Tools: Introduction to Slide Rules 2 (of 2)	
4	1-27-20	Computing with Slide Rules: Multiplication and Division using Slide Rules 1 (of 2)	Worksheet 1 Due; Reading Quiz 3 (HF Ch.7,8,9)
	1-29-20	Computing with Slide Rules: Multiplication and Division using Slide Rules 2 (of 2)	Discussion Prompt 3 Due
	1-30-20		Discussion Prompt 3 Response to Classmates Due
	1-31-20	Mathematical Tools: Wind Tunnels	Worksheet 2 Due
5	2-3-20	Computing with Slide Rules: Squares, Cubes, Roots, and Powers 1 (of 2)	Reading Quiz 4 (HF Ch.10,11) Due
	2-5-20	Computing with Slide Rules: Squares, Cubes, Roots and Powers (2 of 2)	Discussion Prompt 4 Due
	2-6-20		Discussion Prompt 4 Response to Classmates Due
	2-7-20	Mary Jackson: Advocacy in STEM; What about the Men at NACA?	Worksheet 3 Due
6	2-10-20	Computing with Slide Rules: Log Log 1 (of 2)	Reading Quiz 5 (HF Ch.12,13,14) Due
	2-12-20	Computing with Slide Rules: Log Log 2 (of 2)	Hidden Figure Analysis Due; Discussion Prompt 5 Due
	2-13-20		Discussion Prompt 5 Response to Classmates Due
	2-14-20	Mathematics of Space Travel	Worksheet 4 Due
7	2-17-20	Computing with Slide Rules: Trigonometry 1 (of 2)	Reading Quiz 6 (HF Ch.15,16) Due
	2-19-20	Computing with Slide Rules: Trigonometry 2 (of 2)	Discussion Prompt 6 Due
			Discussion Prompt 6 Response to Classmates Due

	2-21-20	FORTRAN: Mathematical Training to Computer Programming; Katherine Johnson: Belonging in STEM	Service Learning Reflection 2 Due
8	2-24-20	Communicating Mathematics: Technical Reports	Reading Quiz 7 (HF Ch.17,18) Due; Mathematical Description Consultations Scheduled
	2-26-20	Communicating Mathematics: Science Writing and Breaking things down for a General Audience	Mini Project Due; Discussion Prompt 7 Due; **CML Presentations Signup**
	2-27-20		Discussion Prompt 7 Response to Classmates Due
	2-28-20	Sputnik: from NACA to NASA	
9	3-2-20	Civil Rights and the Space Race: A Tale of Two Virginias	**CML Presentations Begin;** Reading Quiz 8 (HF Ch.19,20) Due
	3-4-20	Mathematical Access: Mentors and Trail Blazers	Mathematical Description Consultation Deadline; Discussion Prompt 8 Due
	3-5-20		Discussion Prompt 8 Response to Classmates Due
	3-6-20	Christine Darden: On Their Shoulders	
10	3-9-20	Evolution of the West Computers	Reading Quiz 9 (HF Ch.21) Due
	3-11-20	Intersections of Mathematics and Society: Executive Orders and Advancement at Langley	Mathematical Description Due; Discussion Prompt 9 Due
	3-12-20		Discussion Prompt 9 Response to Classmates Due
	3-13-20	Katherine Johnson and Orbital Flight: “Get the Girl to Check the Numbers”	
11	3-16-20 to 3-20-20	No Class: Spring Break	
12	3-23-20	Mathematics of Getting to the Moon: Apollo 11 and Apollo 13	Reading Quiz 10 (HF Ch.22,23) Due
	3-25-20	Mathematics of Getting to the Moon: Apollo 11 and Apollo 13	Service Learning Reflection 3 Due; Discussion Prompt 10 Due

	3-26-20		Discussion Prompt 10 Response to Classmates Due
	3-27-20	Intersectionality and the Women in Hidden Figures	
13	3-30-20	Civil Rights and the Space Race	Reading: HF Epilogue Due
	4-1-20		
	4-2-20		
	4-3-20	Being a "Hyphen"-Scholar: Career Compromise in Hidden Figures	
14	4-6-20	Hidden Figures Revealed	Group Presentations
	4-8-20		
	4-10-20		
15	4-13-20	Hidden Figures Revealed	Group Presentations
	4-15-20		
	4-17-20		Service Learning Reflection 4 Due
16	4-20-20	**Last Day of Classes** Intersections of Math and Society: World War II to Present	**Hidden Figures Showcase (tentatively 6:00pm)**

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

Mental Health Statement

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential

mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614- 292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on call counselor when CCS is closed at 614-292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-800-273- TALK or at suicidepreventionlifeline.org.

Disability Services

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Title IX Statement

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at https://titleix.osu.edu or by emailing the Ohio State Title IX Office at titleix@osu.edu.

Diversity Statement

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined

as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.