

University of West Georgia

MATH 3805: Functions and Modeling

Spring 2019

Course Syllabus

Instructor: Dr. Christopher Jett

Office: 322 Boyd Building

Class Location: 304 Boyd Building

Office Hours: T/R 10:30–11:00 a.m.

1:00–3:30 p.m.; Others by appointment

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Class Meeting: T/R 11:00–12:15 p.m.

Catalog Description: This mathematics course is designed to address the unique needs of future teachers of mathematics. It is required of UTEACH mathematics majors and also counts toward their mathematics degree. In the course, students engage in explorations and lab activities designed to strengthen and expand their knowledge of the topics found in secondary mathematics.

Special Note about this Course: This course's theme of Teaching and Learning Mathematics for Social Justice (TLMSJ) is funded by the STEM Education Enhancement Plan (SEEP).

University Policy: Please carefully read and review the important information at the following link: http://www.westga.edu/assetsDept/vpaa/Common_Language_for_Course_Syllabi.pdf. This link contains material pertaining to your rights and responsibilities as a student in this class. Because these statements are updated as federal, state, university, and accreditation standards change, please carefully review the information each semester.

Required Texts:

Adams, C., Thompson, A., & Hass, J. (1998). *How to ace calculus: The streetwise guide*. New York, NY: W. H. Freeman and Company.

Gutstein, E. R., & Peterson, B. (2013). *Rethinking mathematics: Teaching social justice by the numbers*, (2nd ed.). Milwaukee, WI: Rethinking Schools.

Ronau, R., Meyer, D., Crites, T., & Dougherty, B. (2014). *Putting essential understanding of functions into practice in grades 9–12*. Reston, VA: National Council of Teachers of Mathematics.

Student Learning Outcomes: In this course, you should be able to do the following:

- Demonstrate proficiency in working with function related topics and mathematical modeling.
- Broaden your understanding and strengthen connections between secondary school mathematics and undergraduate mathematics.
- Synthesize mathematics education research literature.
- Exhibit proficiency in using technology in the mathematics classroom.
- Present mathematical ideas and topics in a knowledgeable and effective manner.
- Become efficient seekers of mathematics content and pedagogical knowledge.
- Plan and teach mathematics lessons with social justice aims.
- Become more familiar with our flagship professional organization—the National Council of Teachers of Mathematics (NCTM)—and its related resources.
- Establish personalized reform-based visions for teaching secondary mathematics aligned with the Common Core State Standards for Mathematics.

Attendance Policy:

It is my expectation that you will attend every class session and be punctual. Class participation entails being an active participant during the mathematics teaching and learning process. In the event of an absence, you are expected to get the materials and information relevant to the missed class from your peers. There are only 4 excused and unexcused absences allowed during the semester. If you exceed 4 absences, then you will fail the course. Please note that it is your responsibility to sign the attendance sheet during each class period.

Evaluation Techniques:

Homework: 10%

Reading Facilitator: 5%

Math and Social Justice Brochure: 5%

Exam I: 20%

Final Exam: 25%

MATH Day Competition: 5%

Underrepresented Math Professional: 5%

Microteaching Project: 5%

Exam II: 20%

Information about Course Assignments:

Homework

You will complete the homework problems/problem sets and place them in a homework folder. Homework folders will be turned in on examination days.

Reading Facilitator

As it stands, *Mathematics Teacher* is the leading journal for secondary mathematics practitioners, and *Mathematics Teaching in the Middle School* is the leading journal for middle school mathematics practitioners published by NCTM. You will select and serve as the reading facilitator for one of the articles.

MATH Day Mathematics Competition

The Department of Mathematics has organized a mathematics competition for UWG's undergraduate students. You are required to enter the competition as a minimum amount of mathematics background knowledge is needed for entry into the competition. Please sign up to participate in the Undergraduate Mathematics Competition during our annual MATH Day.

Underrepresented Mathematicians/Mathematics Educators

You will conduct some research on an underrepresented mathematician or mathematics educator, write/submit a 500 word paper on this professional, and share information with our class community on your scheduled presentation date.

Mathematics and Social Justice Brochure

You will prepare and submit a brochure related to teaching mathematics for social justice. Additional information concerning this assignment will be posted in CourseDen.

Microteaching Project

You will complete a final microteaching project. A rubric concerning specific information about this assignment will be posted in CourseDen.

Examinations I & II

Each examination will consist of an assessment of the mathematics concepts covered.

Final Examination

The final examination will consist of a **cumulative** assessment of the mathematics concepts covered throughout the entire semester.

Important Dates:

- MATH Day is scheduled for Friday, March 1st.
- The mathematics and social brochure is due on Tuesday, April 16th.
- The microteaching presentation is scheduled for Tuesday, April 23rd.
- The final exam is scheduled for Tuesday, May 7th from 11:00 a.m.–1:00 p.m.

Class Policies and Procedures:

1. All course assignments will be uploaded to CourseDen.
2. There will be no make up for any of the presentations. Failure to present on your scheduled date will result in a grade of zero.
3. Late work is accepted with a 50% penalty for one late assignment. Other late submissions above the allotted one will result in a grade of zero.
4. If you must miss an exam and you have excused documentation, then the final examination will be used for the missed test in the calculation of your final course grade.
5. Calculators can be used during examinations; however, cell phones may not be used.
6. Cheating is not tolerated. If you are caught cheating, then you will receive a zero for the test or assignment and will be reported for academic dishonesty.
7. Grades cannot be sent via e-mail to you. You are expected to keep accurate records and ascertain where you stand in the course.
8. The tentative, daily schedule is included at the end of this syllabus.
9. Conferences with the professor can be beneficial and are encouraged. All conferences should occur during office hours.
10. Office hours will not be kept during final exam week. If a meeting is necessary during the final exam week, then please schedule an appointment.

Course Readings:

- Cirillo, M. (2009). Ten things to consider when teaching proof. *Mathematics Teacher*, 103(4), 250–257.
- Hung, M. (2015). Talking circles promote equitable discourse: A structured discussion format disrupts patterns of stratified talk and facilitates broader participation. *Mathematics Teacher*, 109(4), 256–260.
- Jett, C. C., Stinson, D. W., & Williams, B. A. (2015). Communities for *and* with Black male students. *Mathematics Teacher*, 109(4), 284–289.
- Karp, K. S., Bush, S. B., & Dougherty, B. J. (2015). 12 math rules that expire in the middle grades. *Mathematics Teaching in the Middle School*, 21(4), 208–215.
- Larnell, G. V., Bullock, E. C., & Jett, C. C. (2016). Mathematics, social justice, and race: A critical race analysis of teaching mathematics for social justice. *Journal of Education*, 196(1), 19–29.
- Lesser, L. M. (2014). Staring down stereotypes. *Mathematics Teacher*, 107(8), 568–571.
- Oslund, J. A., & Barton, J. (2017). Creating zines: Supporting powerful math identities. *Mathematics Teaching in the Middle School*, 23(1), 20–28.
- Paoletti, T., Stevens, I. E., & Moore, K. (2017). Tricks may inhibit students' reasoning. *Mathematics Teacher*, 110(6), 446–453.
- Perry, A. (2018). 7 features of equitable classroom spaces. *Mathematics Teacher*, 112(3), 186–191.
- Rubel, L. H. (2016). Speaking up and speaking out about gender in mathematics. *Mathematics Teacher*, 109(6), 434–439.
- Wu, H. (2011). The mis-education of mathematics teachers. *Notices of the AMS*, 58(3), 372–384.

Social Justice-Related Resources:

- Delpit, L. (2012). *“Multiplication is for White people”*: Raising expectations for other people’s children. New York, NY: The New Press.
- Freire, P. (2005). *Pedagogy of the oppressed*. New York, NY: Continuum International Publishing Group.
- Gutstein, E. R. (2006). *Reading and writing the world with mathematics: Toward a pedagogy for social justice*. New York, NY: Routledge.
- Kenschaft, P. C. (2000). *Change is possible: Stories of women and minorities in mathematics*. Providence, RI: American Mathematical Society.
- Leonard, J. (2018). *Culturally specific pedagogy in the mathematics classroom* (2nd ed.). New York, NY: Routledge.
- Leonard, J., & Martin, D. B. (Eds). (2013). *The brilliance of Black children in mathematics: Beyond the numbers and toward new discourse*. Charlotte, NC: Information Age.
- Shetterly, M. L. (2016). *Hidden figures: The American dream and the untold story of the Black women mathematicians who helped win the space race*. New York, NY: Harper Collins.
- Walker, E. N. (2014). *Beyond Banneker: Black mathematicians and the paths to excellence*. Albany, NY: State University of New York.

Professional Resources:

- Boaler, J. (2015). *Mathematical mindsets: Unleashing students’ potential through creative math, inspiring messages and innovative teaching*. San Francisco, CA: Jossey-Bass.
- Davis, P. J., & Hersh, R. (1999). *The mathematical experience*. New York, NY: Mariner Books.
- Miller, C. D., Heeren, V. E., & Hornsby, J. (2012). *Mathematical ideas* (12th ed.). Boston, MA: Pearson.
- National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics. (2018). *Catalyzing change in high school mathematics: Initiating critical conversations*. Reston, VA: National Council of Teachers of Mathematics.
- Posamentier, A.S., Smith, B. S., & Stepelman, J. S. (2009). *Teaching secondary mathematics: Techniques and enrichment units*, (8th ed.). Boston, MA: Pearson.
- Silver, H. F., Brunsting, J. R., Walsh, T., & Thomas, E. J. (2012). *Math tools grades 3–12*, (2nd ed.). Thousand Oaks, CA: Corwin.

Mathematics-Themed Literature:

- Adams, C., Thompson, A., & Hass, J. (1998). *How to ace the rest of calculus: The streetwise guide*. New York, NY: W. H. Freeman and Company.
- Blatner, D. (1999). *The joy of pi*. New York, NY: Walker & Co.
- Enzensberger, H. (2000). *The number devil*. New York, NY: Holt Paperbacks.
- Huff, D. (1993). *How to lie with statistics*. New York, NY: W. W. Norton and Company.
- Litchman, W. (2008a). *Do the math #1: Secrets, lies, and algebra*. New York, NY: Greenwillow Books.
- Litchman, W. (2008d). *Do the math #2: The writing on the wall*. New York, NY: Greenwillow Books.
- Paulos, J. A. (2001). *Innumeracy: Mathematical illiteracy and its consequences*. New York, NY: Hill and Wang.
- Reimer, L., & Reimer, W. (1990). *Mathematicians are people, too: Stories from the lives of great mathematicians*. Parsippany, NJ: Dale Seymour Publications.
- Vennebush, G. P. (2010). *Math jokes 4 mathy folks*. Bandon, OR: Robert D. Reed Publishers.

Daily Schedule: Spring 2019

Date	Learning Objective
January 8th	Introduction to Functions and Modeling
January 10 th	Number Theory Concepts
January 15 th	Number Relations I
January 17 th	Number Relations II
January 22 nd	Problem Solving I
January 24 th	Proportional Reasoning
January 29 th	Algebraic Concepts I
January 31 st	Algebraic Concepts II
February 5 th	Mathematics Vocabulary
February 7 th	Professor @ Conference: Reading Day
February 12 th	Problem Solving II
February 14 th	Examination I
February 19 th	Functions cont.
February 21 st	Graphs of Functions
February 26 th	Geometric Concepts
February 28 th	Trigonometric Functions
March 1 st	UWG's Mathematics Department's Annual MATH DAY¹
March 5 th	Counting Principles
March 7 th	Problem Solving III
March 12 th	Quadratic Functions
March 14 th	Infusing Literature in the Secondary Mathematics Classroom Happy Pi Day!!!
March 19 th	Spring Break: No Class
March 21 st	Spring Break: No Class
March 26 th	Matrices
March 28 th	Mathematical Misconceptions
April 2 nd	Problem Solving IV
April 4 th	Examination II
April 9 th	Professor @ Conference: Online Reading Response
April 11 th	Technology Day
April 16 th	Brochures & Georgia Milestones/SAT
April 18 th	GACE/Praxis II
April 23 rd	Microteaching
April 25 th	Continuing in the Profession
April 30 th	Review for Final Examination
May 2 nd	Final Examinations: No Class
May 7 th	<i>Final Examination: 11:00 a.m. – 1:00 p.m.</i>

¹ As mentioned on page 3, MATH Day is on a Friday, so please make arrangements to be present.