

Math 105C: Mathematics and Pedagogy for Teaching Secondary Mathematics

- [Math 105A](#)
- [Math 105B](#)

Description

Math 105C is the third quarter in a team-taught course that aims to help you connect your undergraduate coursework to the secondary mathematics curriculum and to deepen your understanding of the mathematics you will teach. It also aims to teach you new mathematics content using various research-based instructional strategies and to emphasize problem solving and student presentation of solutions.

Math 105C aims to teach you a variety of research based instructional strategies, skill with the technology and software used in schools, and skill with various models for secondary mathematics topics. The course includes readings and discussion of current math education research and requires observation in local secondary schools.

In Math 105C, students will complete the following performance components:

- presentation of model lessons both in class and in a secondary schoolroom
- presentation of a paper which traces a mathematical topic through the secondary and undergraduate curricula

General Information

Prerequisites:

Undergraduate students should be mathematics majors and graduate students should be in the GSE&IS Teacher Education Program. Success in the course depends upon a solid foundation in the coursework required for a bachelor's degree in mathematics (specifically upper division coursework in Algebra, Geometry and Analysis), as well as a commitment to teaching secondary mathematics. (Senior math majors may be a few courses short of the math course requirement for the bachelor's degree, and TEP students may have a strong minor in mathematics rather than a major.) Course enrollment is by PTE. Enrollment is restricted to the following groups of students who have also completed either Math 105A or Math 105B:

- senior mathematics majors with demonstrated success in the above-mentioned upper- division mathematics coursework and demonstrated interest in mathematics teaching
- graduate students in the GSE&IS Teacher Education Program

Required Texts/Supplies:

Z. Usiskin, A. Perssini, E.A. Marchisotto, and D. Stanley, *Mathematics for High School Teachers, An Advanced Perspective*. (2003) Prentice Hall, Saddle River, NJ

J. Stigler, J. Hiebert, *The Learning Gap* (1999) The Free Press, NY

TI 84 Plus graphing calculator

Instructor Information:

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Meeting Information:

Mondays, 4:00 – 5:50 PM, MS 6221.

Tuesdays, 4:00 – 5:50, MS 6201

Course Grade Components:

Problems of the Week and Homework Exercises: 20%

Several homework exercises (mostly from the text) will be assigned each week, with solutions due the following week. When a POW is assigned, a complete solution, including a thorough description of the solution process, and problem solving strategies used is due the following week.

Quizzes: 10%

A brief quiz covering straightforward mathematics material recently covered in the course will be given at the start of each class.

Reading Summaries: 10%

Readings of math education research will be assigned regularly, with brief summaries and reflections due via online submission.

Final portfolio: 50%

A portfolio consisting of:

- Two lesson plans (developed in Winter quarter and improved upon during spring quarter) along with analysis of video of one of these lessons in a secondary classroom (15%)
- Paper tracing a mathematical topic through the secondary and undergraduate curricula (15%)
- Exemplar Work including one POW, one Reading Summary and Reflection, the Winter quarter Student Interview Project, the Fall quarter Observation paper analyzing the CA and NCTM Standards addresses in secondary classrooms, and two class activities. A short reflection on each piece of exemplar work will be included in this portion of the portfolio. (10%)
- Presentation to the class of the analysis of the video of the lesson and subsequent improvements to the lesson (5%)
- Presentation to the class of the paper tracing a mathematical topic through the secondary and undergraduate curricula (5%)

Participation: 10%

Attendance and promptness to class, active pursuit of problem solutions, presentation of problem solutions to fellow students (at least twice in the quarter), and engagement in and completion of the work of the model lessons will be assessed.

Please note the following policies:

No late assignments will be accepted.

A student who misses their final presentations may receive an incomplete grade in the course providing the student (i) has completed all other grade components at a passing level, (ii) has an ironclad excuse (such as a medical emergency), and (iii), if possible, contacts one of the instructors on or before the day of the presentation to arrange a meeting.

Week	Monday	Tuesday
1	More on Measure: Area: Pythagorean Theorem	Measure: Volume
2	Student Presentations of Lesson Plan	Student Presentations of Lesson Plan
3	Measure: Volume	Measure: Volume
4	Student Presentations of Lesson Plan	Transformations: Symmetries
5	Transformations: Congruence and Similarity	Transformations: in the Cartesian plane
6	Trigonometry: Circular functions, similarity	Trigonometry and complex numbers
7	Probability: finite	Probability: geometric

8	Statistics	Statistics
9	Student Presentations of videotaped teaching	Student Presentations of videotaped teaching
10	Student Presentations of math paper	Student Presentations of math paper

For each of the above content pieces, the teaching, curriculum, and assessment of the content at the secondary level are introduced and analyzed in the context of current research and recommendations.