What are researchable questions for investigating curriculum in mathematics? What are the methods that will yield interesting results in investigating mathematics curriculum? What are the relationships between curriculum and its users? These and other related questions will be addressed in this course.

The main purpose of this course is to help students develop an understanding of the school mathematics curriculum, with a particular emphasis on the U. S. and grades K-16. In this course, the curriculum is understood as both the explicit planned course of learning put before students, and the hidden or latent experiences that students encounter in school settings. Students will become familiar with many key issues faced by diverse stakeholders concerned with the school mathematics curriculum, including teachers, theorists, researchers, curriculum designers, evaluation specialists, assessment developers, and policy makers.

To provide useful contrasts that should deepen students’ understanding of contemporary mathematics curriculum issues in the U. S., the course incorporates historical and international perspectives and current philosophical underpinnings of general curriculum theory. In this course we will get acquainted with issues of the intended curriculum (e.g., the nature of curriculum guidelines or textbooks), the implemented curriculum (e.g., teachers’ enactments of curriculum goals), and the attained curriculum (e.g., assessment of the effectiveness of curriculum).

**Course Expectations**

This 3-credit course is organized as a seminar format, in which the essential feature will be the in-class discussion of the weekly readings by all the attendees. Supportive, productive, and critical inquiry into curriculum issues is both an aim and a means for the course. Students are expected to attend all class sessions, to complete course readings prior to the class for which they are assigned, and participate actively in the discussions. Students are expected to inform the instructor, in advance, of absences.

Reading is a critical component of the course, and as an advanced graduate level course, the reading load is substantial. It is expected that students will come to class having read the assigned material thoroughly and thoughtfully and that they be willing to share their understandings of the readings in order to contribute to the learning of all class members. For each class session there will be a reading assignment, as indicated in the schedule. Students are expected to bring to class questions or
thoughts that the readings have provoked, which will be used to start the conversation about the topic of the day.

**Special Forms of Participation**

**Textbook analysis:** Each student will be assigned a textbook from the list provided and a list of articles that report an analysis of textbooks (included at the end of this syllabus). Your task consists of replicating the analysis found in two of the articles in the list. The experience of doing this analysis will result in a memo including the following:

- The APA reference of the articles chosen and the rationale for the choice.
- A brief summary of the theories upon which the analyses are based.
- A set of possible questions that you could answer using the articles and the textbook assigned and that expand our knowledge beyond what the author(s) found—by virtue of combining the two analyses.
- The findings from the analyses. Analyze only a small portion of your text: between 5% and 10% of the units analyzed by the authors.
- A summary of the difficulties encountered in applying the methodology described in the articles and the decisions you made in order to analyze your text. What do we learn by these combined analyses?
- A brief reflection on the activity: what did you learn through this activity?

The memo is due on CT tools on **February 11 by the end of the day.** On February 4 students will have time to discuss their findings of their analysis during class. Come prepared to discuss your work with the rest of the class.

**The New Math, The Standards & The Postmodern: A Debate.** Each student will participate in one special class session **March 11.** In preparation for the session, the class will be split into three groups. One group will become experts on the “New Math” reforms; the second group will become experts on the “Standards” movement; and the third will become experts on the Common Core State Standards. Each group will prepare a *non-talking-head* presentation (i.e., a parody, a dramatization, a personification, a song, a poem, a video) about the principles and rationale behind each of these approaches to reforming the **school mathematics** curriculum. In the first part of the class each group will have 30 minutes, 15 min for the presentation and 15 for answering questions about the movement. Each group will distribute a one-page handout with the milestones of the movement, key players, and major outcomes. In the second part of the class we will conduct a debate. The instructor and students will play different stakeholder roles in the debate, asking questions of each group and demanding action for issues that are aligned with their own stakeholder roles. A portion of class on **February 18** will be devoted to helping groups organize this presentation.

**Group Research Project.** Students working in pairs are expected to select a topic tied to the school mathematics curriculum issues treated in this course, to conduct an independent investigation of this
topic, and to prepare a paper and a poster presentation based on this investigation. In many cases, the written paper will take the form of a review and synthesis of literature related to the topic, but other formats are also possible, depending on the nature of the topic being pursued. Students should select a topic in consultation with the course instructor, who can provide initial guidance in finding appropriate sources for the investigation. The reason why this is a joint project is because it is expected that you will have an opportunity to share ideas, discuss options, and think through options with other students who are learning along with you. Joint projects are more demanding than individual projects, so you should expect to invest on it probably twice the time you would devote to an individual project. The following are possible areas and topics that you can pursue in this investigation (these are suggestive rather than exhaustive):

- An analysis of a curriculum topic, either from a historical or a cross-national perspective, for example: multiplicative reasoning, ratio, variables, proof, problem solving, functions, statistical reasoning, discrete mathematics; or propose a topic to the instructor.

- An analysis of an innovative curriculum development project within or outside the United States, for example: Harvard Calculus Reform Project, Adult Literacy and Numeracy, Inquiry/Problem-Based Learning, a national teacher education curriculum.

- An analysis of one curriculum-related issue that may have policy implications, for example: the evolution and curricular implications of “mathematics for all,” “mathematics and democracy,” “college for all”; research and theory related to teacher learning through engagement with innovative student curriculum materials; the evolving role/place of technology in the school mathematics curriculum.

There are two products of this group research project, a poster presentation and a written paper (max 30 pages in length). The poster session will be held on April 15 and it will be conducted as a conference poster session. The written paper is due the last day of class, April 22.

The investigation will be a 4-stage process as follows:

1. **Selection of project focus:** Of the three alternatives proposed, students need to discuss and agree on one they would like to investigate together. Once they have agreed upon the focus of the investigation, students should write a memo presenting their topic, motivation, and learning goals for the project. This memo is due on January 28th on CTools.

2. **Data collection and analysis:** Students should discuss with the instructor the types of sources they will use for their investigation. After such discussion, they will write a second memo including the timeline for working on the project, an outline of the paper, and assigned responsibilities for collecting data, reporting, editing, etc., for both the paper and the poster. The memo should be posted on February 25 on CTools.

3. **Paper draft:** Three weeks before the presentation of the poster (April 1, on CTools), students should post a draft of their written paper (including references in APA style but not appendices) that summarizes their investigation on CTools. This draft will receive feedback from the instructor.
4. **Reporting**: Students will present both orally and in writing the results of their investigation. For the oral presentation (**April 15**) the students will use a poster, in which they will convey the main questions answered with the investigation, and insights and either potential lines of research or practical applications of the investigation. Other graduate students or faculty in the SoE may attend the poster session. The written report is due on **April 22 by 9am** and it should address the feedback provided to the earlier draft and the feedback received during the poster session. More details about these activities will be given throughout the term.

Unless otherwise indicated, all written submissions should be double-spaced, use a 12-point size font (Times family recommended), have one-inch margins, and be submitted as a word .DOC file via CTools (no e-mail, please). All documents should have a title that is pertinent to the content (not MEMO 1), the name of the author(s), and have a footer that will have the name of the file, page, and EDUC 783-Win14. Label your file as follows: LastName_mm.dd (e.g., Mesa_09.15, indicates that Mesa posted the file on Sep 15). CTools will not accept late submissions. A special folder labeled, “Late Submissions” can be used when the time for submitting assignments has passed.

**Grading**

A letter grade (A, B, etc.) will be determined based on assessment of performance in each of the special forms of assessment plus class participation, as follows:

**Class participation.** Assessed considering attendance and responsible contribution to the class discussion (active listening and professional interventions). Class participation will count towards 10% of the final grade.

**Textbook analysis memo.** Assessed considering the understanding of the articles and the methodologies used and the insights gained by doing the combined analysis. This assignment will count towards 20% of the final grade.

**Debate.** Assessed considering originality, accuracy, and completeness of the information presented, and the ability to deal with the questions posed during the debate by the stakeholders. This assignment will count for 30% of the final grade. Being a group assignment, the final grade will be adjusted according to the level of contribution of each participant. Such contribution will be assessed after the debate.

**Group research project.** The several stages outlined in the description will be considered in assessing students’ performance on this project. This assignment will count for 40% of the final grade. Being a group assignment, the final grade will be adjusted according to the level of contribution of each participant. Such contribution will be assessed throughout the duration of the project, via a peer assessment form that will be tailored for the project.

A grade of A will be given to students who besides complying with the assignments and deadlines provide thoughtful, creative, and original contributions to the class, provide evidence of deep understanding of the material, and indications that are able to advance their own lines of inquiry. Lower grades will be given when students comply unevenly with assignments, or show partial interest on understanding the readings or assignments, do not suggest nor propose original interpretations or innovative lines of inquiry. A failing grade will be given when students do not
comply with the assignments, deadlines, or fail to participate actively in understanding the material or prevent other members of the class to accomplish the course goals.

**TEXTBOOKS AND OTHER READINGS**

The following texts are required:

This book provides us with theoretical principles for looking critically at curricula. It uses a British reform project, the School Mathematics Project, (SMP) to illustrate those principles.

The following texts are optional:

This book has a number of chapters that summarize the current thinking on curriculum as it is enacted in classrooms


In addition, depending on their teaching interest, students are expected to become familiar with either of the following standards documents:


Copies of the NCTM standards may be obtained from NCTM's website or borrowed from faculty or advanced graduate students at U-M. The document may also be available for examination electronically. Useful web sites for NCTM documents and/or related materials: [http://standards.nctm.org](http://standards.nctm.org) and [http://forum.swarthmore.edu/mathed/nctm.new.pedagogy.html](http://forum.swarthmore.edu/mathed/nctm.new.pedagogy.html)

Copies of the AMATYC document can be downloaded directly from their website, AMATYC.ORG.

Other readings—journal articles, chapters from reports and books—are assigned throughout the semester. A list of assigned readings for each week is contained in this syllabus. The readings may be obtained by locating the source document in one of the campus libraries.
Titles for Textbook Reviews

The students will analyze one textbook from following list. Students may borrow textbooks from the instructor, from the individual research projects in the School, or from instructors in the math department:

Textbooks
1. Everyday mathematics
2. Investigations
3. Connected Mathematics Project
4. Core Plus Mathematics
5. Harvard Calculus
6. Calculus by Stewart, Apostol, or Spivak
7. “Harvard” Algebra
8. Developmental Mathematics
9. Mathematics for Elementary/Secondary School Teachers (e.g., Bassarear, Bennet & Nelson; Musser, Berger, & Peterson; Beckman).

Schedule

The following is the plan for the course. The assigned reading is to be done before the corresponding class meets. All students are responsible for all the readings for a given session. Most of the articles are available in electronic form, either in the Resources Folder in CTools or in the library Catalog. They can also be requested via 7Fast free of charge to graduate students.

CLASS 1 JANUARY 14 CURRICULUM AND CURRICULUM DEVELOPMENT: PRESSURES, BARRIERS, STRATEGIES

Readings:

Reflection on the readings: The readings are from different eras and from different school levels. What is similar, what is different, what is transient, what is permanent?
### Class 2  January 21  Curriculum and Textbook Research

5. DOW: Chapters 1-3  

Reflection on the reading: How are these authors conceptualizing curriculum?

### Class 3  January 28  Textbook Research

**Readings:**  
10. DOW Chapter 8  

Reflection on the readings: Find points of agreement and disagreement across the authors about the question of “what is so special about mathematics texts.”

**Final Project Topic Memo Due**

### Class 4  February 4  Research on School Mathematics Textbooks

**Readings:**  
15. DOW Chapter 9  
17. Read the abstracts of the other articles chosen by your classmates and read two (different from the ones you used).

**Textbook Analysis Presentation Due**

### Class 5  February 11  The Pre-Standards Era: New Math & Back to Basics

**Readings:**  
18. DOW Chapter 10
20. Howson, Keitel, Kilpatrick, pp. 100-107 & 132-139 (the PDF file has the 132-139 pages before the 100-107 pages)

Reflection on the reading: Derive lessons from the New Math and the Back to Basics reforms that you would apply if you were to engage in a curriculum development project today.

Textbook Analysis Memo Due

**CLASS 6  FEBRUARY 18  THE STANDARDS MOVEMENT**


Reflection on the reading: How are standards defined? What ideologies are behind these definitions?

**Time allotted for debate preparation**

**CLASS 7  FEBRUARY 25  THE COMMON CORE STATE STANDARDS**

Readings:


Reflection on the reading: What is new and what is ‘old’ in the CCSS?

**Final Project, Data Analysis Memo Due**

Midterm Student Feedback
**March 4: No Class: Winter Break**

**Class 8 March 11  School Mathematics Curriculum Reform: A Debate**

*Reading*


**Class 9 March 18  Teachers and Mathematics Curriculum**

*Readings*

32. DOW Chapter 11


'Reflection on the reading: How is the teacher conceptualized in these studies?*

**Class 10 March 25  Teachers and Mathematics Curriculum**

*Readings*

35. DOW Chapter 6


'Reflection on the reading: How is curriculum conceptualized in these studies?*

**Class 11 April 1  Teachers and Mathematics Curriculum**

*Readings*

38. DOW: Chapter 7

39. TU: Chapters 1, 6, 7


'Reflection on the reading: Contrast approaches to investigating the enacted curriculum.*

**Final Project: Draft Paper due**
Studies of International School Mathematics Curricula

Readings:

Reflection on the reading: Define opportunity to learn. Use examples from the readings to illustrate the importance of this notion.

Poster Session

In the first section of the class, we will hear from each presenter, ask questions and give feedback. In the second section, visitors will interact with the presenters.

Impact of School Mathematics Curricula

Readings:
44. ST Chapters 3 (Everyday Mathematics) OR 4 (Investigations)
45. ST Chapters 9 (CMP) OR 14 (CPM)
46. ST Chapter 20 (Kilpatrick Reaction)

Reflection on the reading: How is student learning conceptualized in these studies of curriculum?

Final Paper Due

Curriculum Bibliography

The following are readings that are worth reviewing to gain in-depth information about curriculum in mathematics in the United States. They are loosely organized by ‘topic.’

*Debate Readings*


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**HISTORICAL READINGS**


**CRITICAL READINGS**


**REFORM**


**STUDIES ON TEXTBOOKS**


