

**MAED 548 - 001: Secondary Mathematics Curriculum and Pedagogy Issues (3 credit hours) Spring 2014**

**Instructor:** Dr. Frank Pullano, 168 Bancroft Hall, 323-4569, [pullanof@winthrop.edu](mailto:pullanof@winthrop.edu), <http://faculty.winthrop.edu/pullanof/>

**Meeting Time and Location:** MW 3:30 – 4:45, Kinard 302

**Office Hours:** TR 3:30 – 4:30 and by appointment.

**Evaluation:** Your grade in this course will be based upon the following criteria:

Short Papers	15%	Class Participation and Presentations	15%
Literature Review	25%	Other Assignments	15%
Historical Development of Mathematics	10%	Final Exam Unit Plan due 3:00 p.m., Tuesday, May 6	20%

The following overall percentages will be used to determine your final grade:

Undergraduate Credit: 100–93 = A, 92–90 = A–, 89–87 = B+, 86–83 = B, 82–80 = B–, 79–77 = C+, 76–73 = C, 72–70 = C–, 69–67 = D+, 66–63 = D, 62–60 = D–, 59 and below = F

Graduate Credit: 100–90 = A, 89–80 = B, 79–70 = C, 69 and below = F

**Required Texts:** *Journey Through Genius* by William Dunham. (Available through Amazon.com. I also have a few copies I can sign out.)  
*Publication Manual of the American Psychological Association 6<sup>th</sup> Edition*

**Calculator:** You are required to have some type of graphing calculator preferably a TI or Casio. If all you have is a HP see me and I may have a calculator you can borrow for the semester.

- Policies:**
1. Attendance – Be present. Four or more absences will result in a grade of F.
  2. Be prepared to participate in class discussions and activities every day.
  3. All assignments are due on the day designated by me. An occasional extension may be granted under *exceptional circumstances* if discussed with me prior to an assignment's due date. Any assignments turned in late will be subject to a grade reduction. All assignments must be turned in in order to pass the course.
  4. All written work is to be word processed, Times New Roman 12, double spaced, and with 1 inch margins and include a cover sheet.

**Objectives of this Course:** The objectives of MAED 548 are to broaden the prospective mathematics teacher's background and contact with ideas, innovative and traditional mathematics teaching methods, curriculum materials, resources and technologies, and knowledge of content and discourse of mathematics including:

- Secondary mathematics concepts, procedures, and the connections among them.
- Research and national and state guidelines relating to mathematics instruction.
- Ways to reason mathematically, solve problems, and communicate mathematics effectively at different levels of formality.
- Use of graphing calculators, computers, and other technologies as tools for teaching mathematics.
- Use of a variety of manipulative and visual materials for exploration and development of mathematical concepts in grades 7 – 12.

**Descriptions of Course Requirements:**

Writing Assignments: This course has been designed to meet the requirements of a Writing Intensive Course and qualifies as such. In order to meet these requirements you will be asked to complete the following:

Literature Review: This review of the literature will deal with the teaching of a mathematics concept or issue in mathematics education. The topic you select is subject to my approval. See page 3 for possible topic ideas. You

will be required to present a summary of content to the class and schedule an appointment with the Writing Center for a critique of your paper before handing in the final draft. See syllabus pages 3-5 for other guidelines and due dates. Please visit the following sites for more information on what a literature review is and some helpful pointers on preparing a literature review:

The Literature Review: A Few Tips On Conducting It: <http://www.writing.utoronto.ca/advice/specific-types-of-writing/literature-review>

How to Write a Literature Review: <http://library.ucsc.edu/ref/howto/literaturereview.html>

*Class will meet in the lobby of Dacus Library next class Wednesday, January 15 for training on available library resources useful for your research project. **Bring your Winthrop ID.** Do not be late or absent.*

Short papers: These papers will include article responses, short expository writings dealing with the teaching of mathematical concepts, critiques of lessons prepared for and presented to the class, reactions to guest speakers, etc. These papers should be at least 2 pages in length (title page not included). Typically, the topics for these papers will be discussed in class prior to their due date.

Historical Developments of Mathematics: See attached. This paper is due Friday, April 4<sup>th</sup> no later than 5:00 pm.

Unit Plan and Lesson Plans: Your final exam in this class will consist of developing a unit plan and accompanying lesson plans, materials, and assessments for Algebra I. Your completed unit plan will be due **Tuesday, May 6 at 3:00 p.m.** the designated final exam period for this course. As we progress through the semester we will discuss how to write unit and lesson plans and I will provide you with examples of these. Additional lesson plans will be assigned periodically throughout the semester.

#### Professional Memberships:

1. The National Council of Teachers of Mathematics (NCTM) is the leading professional organization concerned with the teaching of mathematics in grades K-12. You must become a student member. This costs \$40 for which you will receive an electronic magazine of your choosing – I recommend either *Mathematics Teacher* (geared toward high school) or *Mathematics Teaching in the Middle School*. Members also receive a 20% discount on any orders. In addition, you will have access to on-line materials – some of the required readings will be found here. Please join as soon as possible. You can do this via the web, by phone, or by mail. The website is [www.nctm.org](http://www.nctm.org). Once at the site, click on the Membership link (top of page), and then select one of the click on Student E-Membership options. You may join online or by mail.

For those of you who will take MAED 391/591, your membership should cover you for the entire year. Plus if you are going to be a middle level/secondary mathematics teacher or even an elementary teacher who must teach mathematics you should be a member – you can get some great stuff.

2. You must also join the South Carolina Council of Teachers of Mathematics (SCCTM) at <http://www.scctm.org>. This will cost you \$10 and give you access to the online publication THE MATHMATE which is published 3 times per year. Return the attached form for SCCTM membership to me next class with a check for \$10 made out to SCCTM. I will send in all registration forms at once.

Praxis II: You should register for and complete the needed exam(s) below this semester:

Area of Licensure	Required Examination Number	Required Score
Mathematics	5161	160
Middle Level Mathematics	5169 <b>OR</b> 5161 <b>AND</b> 0063	165 <b>OR</b> 160 <b>AND</b> 137

Computer-delivered and Paper-delivered centers and date information can be found here:

[http://www.ets.org/praxis/register/centers\\_dates/](http://www.ets.org/praxis/register/centers_dates/)

Also, secondary certification students will need to pass Principles of Learning and Teaching: Grades 7-12 (test 0624 or 5624) with a score of at least 157 to be recommended for certification while middle level certification will require Principles of Learning and Teaching: Grades 5-9 (exam 0623 or 5623) with a score of at least 160.

Mathematics Tutorial Center: You are required to work 13 hours (1 hour per week) in the Mathematics Tutorial Center located in 271 Bancroft Hall. Sign up for a time in the Math Department office. Be sure to select a time slot that already has been selected by a faculty member. The MTC will open on Tuesday, January 21 so you should start next week.

Class Participation, Presentations, and other Assignments: Throughout the semester you will be required to complete assigned readings, comment on these readings as part of class discussions, prepare lesson plans, practice teach in front of the class, and critique your own performance as well the performance of others. You will be assessed on your preparedness, participation, and contributions to discussions

Graduate Students: If you are taking this course for graduate degree credit (MAT or MEd) you will be required to complete additional and longer assignments.

Students with Disabilities Policy: Winthrop University is dedicated to providing access to education. If you have a disability and require specific accommodations to complete this course, contact the Office of Disability Services (ODS) at 803-323-3290. Once you have your official notice of accommodations from the Office of Disability Services, please inform me as early as possible in the semester.

Student Code of Conduct: As noted in the Student Conduct Code, "Responsibility for good conduct rests with students as adult individuals." The policy on student academic misconduct is outlined in the Student Conduct Code Academic Misconduct Policy in the Student Handbook online (<http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf>).

Syllabus Change Policy: The syllabus reflects expectations for the course; however, the instructor may find it necessary to make changes in the syllabus after the course begins. In such cases, students will be notified accordingly.

### Possible Literature Review Topics

For various reasons, many students experience difficulty understanding or have misconceptions about mathematics and therefore fail to learn many of the following mathematical concepts:

1. Operations involving fractions – common denominator, factoring, giving meaning to multiplication and divisions, etc.
2. Simple formulas in plane geometry – giving meaning to perimeter (10 ft.), area (10 sq. ft.), and volume (10 cu. ft).
3. Operations involving integers.
4. Polynomials – addition, subtraction, multiplication, division, and evaluation of polynomials.
5. Laws of exponents – giving meaning to negative and fractional exponents. Simplifying algebraic expressions with integral and fractional exponents.

6. Visualization of algebra concepts – extracting information from graphs.
7. Global and local interpretation of qualitative and quantitative contextual graphs.
8. Simplifying rational expressions.
9. Solving linear and quadratic equations.
10. Solving equations involving absolute value or square roots.
11. Logarithmic and exponential functions.
12. Trigonometry
13. Conic sections
14. Proof writing.
15. The concepts of function.

You may wish to research other topics related to mathematics education such as:

16. Gender differences within grade levels and content areas.
17. Recent mathematics education reform efforts.
18. The use of specific technologies.
19. The use of manipulatives.
20. Integration of mathematics across the curriculum.
21. Alternative methods of assessment.
22. Issues concerning standardized testing, textbooks, and curriculum.
23. Effectiveness of various instructional strategies (direct, co-op groups, discovery, concept attainment, etc.).
24. Problem solving in the classroom.
25. Attitudes and beliefs of teachers or students.
26. Preservice teacher preparation.

I think you get the idea! The only restriction is that your topic meets with my approval. I will meet with each of you outside of class (it is your responsibility to schedule this appointment) to discuss your topic and help you to determine where to look for literature. Keep in mind that you want to choose a topic that is somewhat narrow but not too narrow. For example, the topic “Algebra” is too broad. You could spend the rest of your life reading research conducted in this area and never finish! On the other hand, “The effects of eating green vegetables on red-haired, ninth grade, gifted female achievement scores” is probably too narrow a topic! In order to avoid a serious nightmare, do not leave topic selection and the researching of your topic to the last minute?

### **Literature Review Guidelines**

You are required to do a review of literature in a field of interest pertaining to mathematics education or research the development of a mathematical concept.

1. Your paper is to be word-processed, double-spaced, Times New Roman 12, have one-inch margins, and be at least 16 (20 for MAT) pages in length (this does not include the title page, references, or diagrams). Pages should be numbered in the top right hand corner.
2. You should have a minimum of 10 sources (MAT students 15 sources). Acceptable sources are journal articles, papers from conference proceedings, books, chapters from books, etc. At least 9 of these sources (MAT students 12 sources) must be research studies from appropriate refereed sources. Any website sources must be approved by me.
3. References and documentation style should follow APA style. Two copies of the APA Manual are kept at the reference desk at Dacus Library. I also have a copy in my office. Please visit the following websites to review:

- The writing rubric ( <http://www2.winthrop.edu/english/WritingProgram/rubric.pdf> ),
- The appropriate use of borrowed information ( <http://www.winthrop.edu/english/plagiarism.htm> ),
- and

-APA style (<http://www2.winthrop.edu/dacus/researchguides/apastylerg.htm>)

It is expected that the documentation in your literature review (as well as all other submitted written work) conform to APA style.

4. I will keep your paper. You may photocopy the paper after it is graded.
5. The grade you receive on your literature review will count as 25% of your grade in MAED 548. However, if you do not complete this assignment, you will fail the course.
6. Your paper should consist of at least three main sections: Introduction/Background, Review of Literature, and Discussion/Implications in that order. We will discuss the contents of each section. Most likely the background section will be the last section you write but will appear first in your paper. In your paper you must demonstrate a connection between your topic and *Common Core Standards* which can be found at <http://ed.sc.gov/agency/programs-services/190/>.
7. Important Dates:

You will provide me with a thoughtful, well developed, well written, typed description of your topic of interest no later than **Monday, January 20 in class** which I will either approve or reject. If rejected, you will need to develop a new idea. You may want to speak with me outside of class if you are having difficulty selecting a topic.

A proposal with reference list is due no later than 5:00 p.m. on **Thursday, February 20**. We will discuss what is expected in terms of the proposal at a later date.

You must turn rough draft of your paper no later than 5:00 p.m. on **Friday, March 21**. *Printed copies of all works cited must accompany your rough draft.*

Your final paper must be turned in no later than 5:00 pm **Friday, April 25**. Again, hard copies of all works cited must accompany your rough draft.

At each deadline you will receive a grade. Your final Literature Review grade will be a combination of these. Let me stress that leaving this project until the last minute is not a good idea particularly since you are required to hand in printed copies of references some of which may come through interlibrary loan.

I have many resources that may be of use such as back issues of the Journal for Research in Mathematics Education, The Handbook of Research on Mathematics Teaching and Learning, and a filing cabinet full of articles. Check with me.