THE COLLEGE AT OLD WESTBURY
STATE UNIVERSITY OF NEW YORK

MA7500: Topics in Mathematics and Mathematics Education

Fall 2014

Professor: Frank Sanacory
Office: NAB 2014 **Office Hours:** MTW 1:00-2:30
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TEXTBOOK: There are two text books required for the course.

- The Mathematics that Every Secondary School Math Teacher Needs to Know by Alan Sultan, Alice F. Artzt, 2010, ISBN: 0415994136.
- Mathematics and Its History by John Stillwell. Springer; 3rd ed. 2010 edition ISBN-13: 978-1441960528

Topics to be covered

- History of mathematics
- Teaching Secondary school mathematics
- Math Education Research Paper and Presentation

CATALOG DESCRIPTION

This course is an introduction to research in mathematics education. Students will read historical and contemporary research literature and study a topic in the teaching of secondary school mathematics. Possible topics include: teaching the gifted, teaching in a bilingual environment, teaching trigonometry, teaching probability/statistics, teaching AP courses, designing standardized tests such as the SAT. A research paper is required.

COURSE OBJECTIVES or COURSE OUTCOMES

The objective of the course is for students to have profound understanding of teaching skills of school mathematics and to become familiar with historical and contemporary research and to reflect on current and historical trends and to have profound understanding of school mathematics.

COURSE EVALUATION & GRADING:

History and Mathematics Test	15%
Test: School Mathematics/Foundations of school math	20%
Mini Literature Reviews/ Presentation:	10%
Mini quizzes from speakers	10%
Culminating Experience: Term Paper/Presentation	20%
Final Exam	25%

REQUIREMENT: NCTM membership (http://nctm.org). NCTM members receive one or two journals with membership and also get access to numerous online resources. Students are urged to join NCTM and make reading a habit of reading professional journals

If you are choosing $39 membership, choose one journal from Mathematics *Teacher* (8– 14), *Mathematics Teaching in the Middle School*
If you are choosing $53 a year membership, choose two journals from *Mathematics Teacher* (8–14), *Mathematics Teaching in the Middle School* and *Journal for Research in Mathematics Education*

TENTATIVE COURSE OUTLINE

- History of Mathematics
  - History and Mathematics Test
- Research in Mathematics Education
  - History of Mathematics Education in America
  - International Assessment of Mathematics and Sciences (TIMMS, PISA)
  - Common Core Curriculum and NCTM Principles and Standards
  - Progression report for your Research Paper
- Teaching and Learning School Mathematics
  - Foundations of Secondary School Mathematics
  - Technology
  - Teaching AP Calculus
  - Test: School Mathematics/Foundations of school math
- Presentations of lessons
  - Math Education Research Presentation
  - Quizzes
- Research Paper
- Review of History and Mathematics Education
- Final Exam 12/17/2014

ACCOMMODATIONS FOR STUDENTS WITH SPECIAL NEEDS: If you have, or suspect you may have a physical, psychological, medical or learning disability that may impact how you function academically and/or your access to activities

on campus, please contact Dr. Lisa Whitten, Director of the Office of Services for Students with Disabilities (OSSD). She will determine whether or not you qualify for academic accommodations and arrange them with your professors if you do. The OSSD is located in the NAB, Room 2064. You can reach Dr. Whitten at 516-876-3009 or whittenl@oldwestbury.edu.

TENTATIVE COURSE OUTLINE

Throughout the semester, material to help profound understanding/teaching of school mathematics will be embedded whenever it is appropriate and relevant.

- History of Mathematics Education in America
- International Assessment of Mathematics and Sciences (TIMMS, PISA)
- Change in Curriculum (Common Core Curriculum and NCTM Principles and Standards)
- Common Core Curriculum and its Progression Document
- Teaching and Learning School Mathematics
- Example of an Lesson Study
- Research Methods
- Research for Secondary School Teachers
- Technology
- Teaching AP Calculus

ADDITIONAL RESOURCES & REFERENCES

Journals from NCTM,

- *Mathematics Teacher.*
- *Mathematics Teaching in the Middle School.*
- *Teaching and Learning Mathematics, Translating Research for Secondary School Teachers.*
- *NCTM Principles and Standards, accessible by online*

Related to Common Core Standards

Other Resources

Common Core Curriculum: *http://www.corestandards.org/*

Artzt, A. F. & Newman, C. M. (1997*). How to Use Cooperative Learning in the Mathematics Class*.Reston, VA: NCTM.

Berlinski, D. (1995). *A Tour of the Calculus*. New York: Random House.

Campbell, P.F. & Silver, E. A. (2000). *Teaching and Learning Mathematics in Poor Communities:Report of a Task Force*. Reston, VA: NCTM.

Johnson, D. R. (1982). *Every Minute Counts: Making Your Math Class Work*. Palo Alto: Dale

Johnson, D. R. (1986). *Making Minutes Count Even More*. Palo Alto: Dale Seymour Publications

Johnson, D. R. (1994). *Motivation Counts: Teaching Techniques That Work*. Palo Alto: Dale Seymour Publications

Leinwand, S. (2000). *Sensible Mathematics: A Guide for School Leaders*. Portsmouth, NH:Heinemann.

Malloy, C.E., & Brader-Araje, L. (Eds.), (1999). *Challenges in the Mathematics Education of African American Children: Proceedings of the Benjamin Banneker Association Leadership Conference*. Reston, VA: NCTM.

Orr, E. W. (1987). *Twice As Less: Black English and the Performance of Black Students in Mathematics and Science*. New York: Norton.

Ortiz-Franco, L., Hernandez, N. G., & De La Cruz, Y. (Eds.), (1998). *Changing the Faces of Mathematics: Perspectives on Latinos*. Reston, VA: NCTM.

Paulos, J. A. (1988). *Innumeracy: Mathematical Illiteracy and Its Consequences*. New York: Hill &Wang.

Peterson, I. (1988). *The Mathematical Tourist: Snapshots of Modern Mathematics*. New York: W. H. Freeman.

Polya, G. (1945). *How to Solve It*. Princeton, NJ: Princeton University Press.

Sobel, M. A., & Maletsky, E. M. (1998). *Teaching Mathematics: A Sourcebook of Aids, Activities and Strategies*. Third Edition, Allyn & Bacon.

ACCOMMODATIONS FOR STUDENTS WITH SPECIAL NEEDS

If you have or suspect you may have a physical, psychological, medical or learning disability that may impact your course work, please contact The Office of Services for Students with Disabilities (OSSD), Phone: 516-876-3009, Fax: 516-876-3005, TTD: 516-876-3083. The Office will help you determine if you qualify for accommodations and help you get them. All support services are free and all contacts with the OSSD are strictly confidential.