GEORGE MASON UNIVERSITY
College of Education and Human Development
Elementary/Secondary Education

EDCI 672
Advanced Methods of Teaching Mathematics in the Secondary School
SPRING 2005
Mondays 4:30 – 7:10 p.m.
Robinson A352

Professor:
Dr. Madeleine “Lynn” Gardner
mgardne5@gmu.edu
703-818-1818

Prerequisites:
EDUC 522 Foundations of Secondary Education &
EDCI 572 Methods of Teaching Mathematics in the Secondary School

Course Description:
This course focuses on the learning processes fundamental to the development of
mathematical thinking from a problem-solving perspective. Students will be introduced
to the national (National Council of Teachers of Mathematics) and state (Standards of
Learning) standards regarding the nature of the content and methodologies appropriate
for the teaching of school mathematics. Students will examine a variety of instructional
strategies and materials and relate them to the broad scope of mathematical content in
the secondary curriculum.

(A 15-hour field experience is required for those seeking initial teacher licensure.)

Required Textbook:
Cangelosi, J.S., Teaching Mathematics in Secondary and Middle School, 3rd edition,

Instructor Goal:
To create a valuable class which will support teachers in their professional growth by
learning new ideas and techniques that can be implemented into their teaching.
**Course Content:**

This course will further explore curriculum and methods of teaching for students in grades 6 – 12 that were begun in the prerequisite course EDCI 572. Using the expectations and suggestions of the NCTM Standards and the INTASC (Interstate New Teacher Assessment And Support Consortium) Standards as guides, this methods course will include lesson planning, writing objectives, developing questions and questioning techniques, planning and implementing cooperative learning activities, developing supplemental problem-sets consistent with the NCTM standards, improving direct instruction techniques, and other teaching strategies.

**Course Format:**

The course will be conducted much like a series of professional development workshops. The workshop-oriented experiences include hands-on activities, group discussions, demonstrations, and case study analyses. With an emphasis on teaching for understanding, students may also work with physical manipulatives, virtual manipulatives, and technologies to explore mathematics, and problem-solving techniques.

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**COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT**

**STATEMENT OF EXPECTATIONS:**

The Graduate School of Education (GSE) expects that all students abide by the following:

- Students are expected to exhibit professional behavior and dispositions.  
  See gse.gmu.edu for a listing of these dispositions.

- Students must follow the guidelines of the University Honor Code.  
  See [http://www.gmu.edu/catalog/apolicies/#TOC_H12](http://www.gmu.edu/catalog/apolicies/#TOC_H12) for the full honor code.

- Students must agree to abide by the university policy for Responsible Use of Computing.  
  See [http://mail.gmu.edu](http://mail.gmu.edu) and click on Responsible Use of Computing at the bottom of the screen.

- Students with disabilities who seek accommodations in a course must be registered with the GMU Disability Resource Center (DRC) and inform the instructor, in writing, at the beginning of the semester.  
  See [www.gmu.edu/student/drc](http://www.gmu.edu/student/drc) or call 703-993-2474 to access the DRC.
Course Requirements:
The course requirements are met by regular (on-time) class attendance, active participation in discussions and activities, and timely completion of assignments & projects. There will be great flexibility in the projects in order to ensure that each student works on something that personally useful.
The field experience requires the student to keep a chronicle of observations.

1) Lesson Plans & Mini-Lessons
At least 4 lesson plans will be submitted for grades and feedback. A portion of, or all of, the lessons will be presented in class, with class members role playing students and critiquing each other. Each plan must follow the outline and requirements posted online which is derived from the College of Education Student Teacher/Intern Manual.

2) Special Projects - TBD

3) Case Analyses
Case analyses allow you to examine many perspectives on the types of problems students experience in school. Case studies give you a chance to practice the approaches that a thoughtful and ethically principled teacher would use to solve these problems. Having a new arsenal of ideas, when faced with problems in your own class you will think, “What might I do differently to help this student be successful?” A case analysis includes:

a) A problem statement
(1-2 paragraphs) that describes what you think the teacher’s responsibility is in the case -- that is, how the teacher contributes to the problem; what role the teacher is playing in the case that is (potentially) putting his/her students at risk, etc.

b) An action plan
After discussion in class, you will write a brief action plan (1-2 pages) for the teacher. This action plan must be directly linked to your problem statement (which was designed to solve the problem) and be based upon specific approaches the authors of our readings feel will help the student(s) most in the long term. Also, you are encouraged to cite relevant experiences you've had in a classroom, either teaching or in field observations. You may use either direct or indirect quotes in the action plan.

Case analyses, which include the problem statement, written before group discussion, and action plan, written after group discussion, are due prior to the next class meeting.

4) Journals
You are required to complete a 15 hour field experience and to keep a journal.

Scoring Rubric

<table>
<thead>
<tr>
<th>Assignment</th>
<th>No Evidence 0</th>
<th>Beginning: Limited Evidence 1-2</th>
<th>Developing: Clear Evidence 3-4</th>
<th>Accomplished: Substantial, convincing evidence 5-6</th>
<th>SCORE</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>20%</td>
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<tr>
<td>Assignments</td>
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<td>Presentations</td>
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<td>Projects</td>
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NOTE:
It is recommended that you retain copies of all course products to document your progress through the Secondary Education Program. Products from this class (lesson plans, a case analysis, or a field experience chronicle) should be included in your exit portfolio for the M.Ed. program and can also become part of your professional portfolio used for job placement.

www.aol @ school.com

INTASC Standards site:
Interstate New Teacher Assessment And Support Consortium

& INTASC “Core Standards”
http://www.ccsso.org/content/pdfs/corestrd.pdf

& INTASC “Math Standards”
http://www.ccsso.org/projects/Interstate_New_Teacher_Assessment_and_Support_Consortium/Projects/Standards_Development/#math

Standards of Learning: Instruction, Training, and Assessment Resources,
Standards of Learning: Mathematics. VA Dept. of Education
http://www.pen.k12.va.us/VDOE/Instruction/sol.html

Standards of Learning Test Information
http://www.pen.k12.va.us/VDOE/Assessment/release2000/

National Assessment of Educational Progress
http://nces.ed.gov/nationsreportcard

Sample NAEP Questions

Third International Mathematics and Science Study (TIMSS)
http://nces.ed.gov/TIMSS/

TIMSS Achievement Items
http://www.timss.org/TIMSS1/items.html
<table>
<thead>
<tr>
<th>Class</th>
<th>Topic</th>
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<tr>
<td>1</td>
<td>Getting Prepared for the Opening of School</td>
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<td>2</td>
<td>Creating a Learning Environment of Discipline &amp; Respect</td>
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<td>3</td>
<td>Motivating Students; Developing Manipulatives</td>
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<td>4</td>
<td>Developing Overall Plans</td>
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<td>5</td>
<td>Exploring Math Websites</td>
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<td>6</td>
<td>Using the Calculator in the Classroom</td>
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<td>7</td>
<td>Computer Lab Usage</td>
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<td>8</td>
<td>National Council of Teachers of Mathematics Resources</td>
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<td>9</td>
<td>Cooperative Learning Plans &amp; Techniques</td>
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<td>10</td>
<td>Preparing Students for the SOLS</td>
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<td>11</td>
<td>Presentations to Student Panel</td>
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<td>12</td>
<td>Assessment/Examination Preparation</td>
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<td>13</td>
<td>Field Observation Discussions &amp; Reports</td>
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<td>14</td>
<td>Final Presentations</td>
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