William Paterson University  
College of Education  
Department of Elementary and Early Childhood Education  

Theme- Preparing Inquiring Educators for Diverse Settings:  
Developing Knowledge, Applications, Dispositions  

COURSE OF STUDY  

1. **Course Title and Credits:** CIMS 3340 Methods/Assessment for Teaching Mathematics in Grades 5-8 (2 undergraduate credits)  

2. **Course Description:**  
The purpose of this course is to prepare teacher candidates as specialists in the learning and assessment of mathematics at the middle school level (grades 5-8). The course extends students’ professional knowledge for teaching and assessing mathematics learned in CIEE 329 for grades K-5 and emphasizes the appreciation of mathematics from the point of view of the cognitive and social changes that occur in early adolescence. Consistent with the principles, standards, and pedagogical techniques in the Common Core Mathematics Standards, adopted by New Jersey (CCMS, 2010) and the National Council of Teachers of Mathematics *Principles and Standards for School Mathematics* (NCTM, 2000), students explore learning in algebra and geometry that go beyond concerns with number. The course places special emphasis on issues of equity, working with diverse student populations, the importance of peer relations in middle school learning, inquiry-based learning, and meeting expectations for standardized state assessments.  

3. **Prerequisites:** CIEE 2290; major in Mathematics or Liberal Studies: Integrated Mathematics and Science  
**Pre-or Co-requisites:** CIEE 3290 and appropriate field experience  

3. **Course Objectives:**  

1. Identify and analyze mathematics content, principles, and processes included in middle school mathematics curricula found in the Common Core Mathematics Standards, adopted by New Jersey (CCMS, 2010), the NCTM *Principles and Standards for School Mathematics*, and state-wide assessments for students in grades 5-8.  
2. Identify cultural, language, and special education factors that affect the learning and assessment of middle school students as they construct and apply mathematical concepts and procedures.
3. Master techniques for deepening middle school students knowledge of rationale number concepts; algebraic facility; appreciation of geometry; connections between algebra and geometry; extending appreciation of statistics, number, and measurement.

4. Utilize standards-based problem solving activities that incorporate problem-based learning, project-based applications, and collaborative processes to enable all students to learn and communicate effectively about middle school mathematics.

5. Utilize multiple forms of representations in the teaching of middle school mathematics content with manipulative materials and technology applications, including graphing calculators and computer simulations.

5. **Student Learning Outcomes:**

The teacher candidate will be able to:

1. Identify and analyze the conceptual and procedural knowledge that 5-8 students need to meet the curriculum content standards through online discussions, in-class discussions, and video analyses.
2. Accurately observe, interpret, and document middle school children’s knowledge and thinking about mathematics through direct observation, clinical interviews and analysis of video examples.
3. Develop, administer, document and reflect on informal and formal assessments of middle school children’s mathematical thinking.
4. Demonstrate in planning and teaching lessons how to use effective instructional strategies in teaching middle school mathematics, such as the use of models, manipulative materials and technology applications, and how to use teaching and assessment techniques to provide equitable opportunities and access for all students to higher level and challenging mathematics knowledge.

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<tr>
<th>Student Learning Outcomes</th>
<th>NJ Teaching Standards</th>
<th>ACEI Standards (SPA)</th>
<th>NCATE Standards</th>
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6. **Course Content:**

   - Six NCTM principles (Equity, Curriculum, Teaching, Learning, Assessment, Technology) and importance of process standards
   - Role of teacher and student dispositions about mathematics in teaching and learning mathematics
   - Problem solving orientation to lesson planning
   - Standards-based elementary mathematics programs and texts for the middle school
   - Impact of high-stakes testing, including state assessments

2. Exploring problem-based learning, models and manipulative materials, cooperative learning, graphing calculators, and computer simulations for teaching the key curricular content areas of middle school mathematics.
   - Extending whole number concepts and computation
   - Rational number concepts and computation—fractions, decimals, percents
   - Algebraic thinking—generalizations, patterns and functions
   - Geometric deduction, two- and three-dimensional, coordinate and transformational geometry
   - Connections between algebra and geometry
   - Proportional reasoning
   - Data analysis and probability
   - Exponents, integers and real numbers

3. Analysis of the cultural, language, and special education factors, including teaching autistic students, that affect learning and assessment of middle school students as they construct mathematical concepts and ways of enabling all students to participate in challenging mathematics curricular content.

4. Developing middle school lesson plans using a variety of representations and learning formats.

5. Assessing the mathematics knowledge of middle school students using formal and informal techniques and examining the role and impact of standardized testing in mathematics at the middle school level.

6. Developing strategies for reinforcing the content, format, and student performance expectations of statewide middle school mathematics assessments.
7. **Teaching/Learning Methods:**

   1. Technology-supported, interactive lectures
   2. Reflection and discussion on assigned readings, virtual manipulative materials, and classroom-based assignments using the Blackboard Discussion Board
   3. In-class and on-line analysis of video clips of children’s mathematical thinking
   4. In-class small group problem solving, exploration of mathematical models, and lesson planning activities

8. **Assessment (Performance Based):**

   1. Weekly assignments on Blackboard Discussion Board and classroom work (SLO 1)
   2. Clinical interview of middle school child to assess thinking strategies and difficulties with selected mathematical concepts (SLO 2)
   3. Fieldwork assignment to analyze classroom environment and teacher actions related to students’ engagement, thinking, sense-making and understanding (SLO 3)
   4. Developing, presenting, and reflecting on a unit plan for the middle school classroom, with related open-ended assessments (including open-ended items of standardized tests) (SLO 4)

9. **Recommended Text/Readings:**

   - Common Core Standards

10. **Preparer’s Names and Date:** Rochelle Goldberg Kaplan, Ph.D., Linnea Weiland, Ph.D. Maureen Calantropio, M.Ed., Fall 2004

11. **Department Approval Date(s):** Fall 2004

12. **Reviser’s Name and Date:** Linnea Weiland, Ph.D., Spring 2010, Lisa Warner, Ed.D., Spring 2011

13. **Department’s Approval Date for Revisions:** Spring 2011
14. **Bibliography:**

- Bright, G. W., Brewer, W., McClain, K., & Mooney, E.S. (2003). *Navigating through data analysis and probability in grades 6-8.* Reston, VA: NCTM.


Stein, M.K. (2001) Teaching and learning mathematics: How instruction can foster the knowing and understanding of number. In S. Pinnegar (Ed.) Subject-specific instructional methods and activities (Advances in Research on Teaching, Volume 8), (pp.111-144). Emerald Group Publishing Limited


Websites


K-12 Mathematics Curriculum Center, http://www2.edc.org/mcc/default.asp
MathsNet, http://www.mathsnet.net/


Shodor, http://www.shodor.org