COURSE SYLLABUS

<table>
<thead>
<tr>
<th>Course Number: MAE 4360</th>
<th>Course Title: Methods of Teaching Mathematics in Middle and Secondary Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prerequisite(s):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professional Development I, II, and III</td>
</tr>
<tr>
<td>Course Credit:</td>
<td>4 Hours</td>
</tr>
<tr>
<td>College:</td>
<td>Arts &amp; Sciences</td>
</tr>
<tr>
<td>Department:</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Required Text(s):</td>
<td></td>
</tr>
<tr>
<td>Supplies:</td>
<td>Hand-outs</td>
</tr>
<tr>
<td>Faculty Name:</td>
<td>Dr. Rebekah M. Lane</td>
</tr>
<tr>
<td>Term and Year:</td>
<td>Summer 2008</td>
</tr>
<tr>
<td>Place and Time:</td>
<td>Jackson – Davis Hall / Room 405</td>
</tr>
<tr>
<td>Office Location:</td>
<td>302 Jackson – Davis Hall</td>
</tr>
<tr>
<td>Telephone:</td>
<td>850-561-2153</td>
</tr>
<tr>
<td>e-mail:</td>
<td><a href="mailto:rebekah.lane@famu.edu">rebekah.lane@famu.edu</a></td>
</tr>
</tbody>
</table>

Office Hours

<table>
<thead>
<tr>
<th>Monday</th>
<th>8:30 – 10:25</th>
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<tbody>
<tr>
<td>Tuesday</td>
<td></td>
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<tr>
<td>Wednesday</td>
<td>8:30 – 10:25</td>
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<tr>
<td>Thursday</td>
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<td>Friday</td>
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<tr>
<td>Saturday</td>
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</table>

Course Description

This course is designed for students who are preparing to teach mathematics to students in grades 6 – 12. Upon completion of the course, you will have discussed pedagogy, classroom management, tools to enhance teaching and learning, and professional ethics.

Conceptual Framework

The Conceptual Framework in the Professional Education Unit (PEU) at Florida A&M University is an integrated approach to providing educational experiences that result in exemplary professional educators. The Framework is comprised of six themes with the mission of developing high quality classroom teachers, administrators and support personnel. The term “exemplary” refers to the kind of graduates the PEU strives to produce. The figure below provides a diagram of the Exemplary Professional Conceptual Framework.

The Conceptual Framework for the FAMU Professional Education Unit is grounded in a combination of directed, constructivist, developmental, and social learning theories derived from the writings of system theorists, educational philosophers, social scientists, practitioner and developmental theorists. Concepts from these writers and from the varied educational learned societies help form the knowledge base for the unit’s curriculum components and principles of its Conceptual Framework.

F=Florida Educator Accomplished Practices Standards (FEAPS)
I=Interstate New Teacher Assessment and Support Consortium Standards (INTASC)
(K)=Knowledge (S)=Skill (D)=Disposition

Approved/Revised 10/30/07
TECHNOLOGY

• CF 2

• Through this focal area, the FAMU professional education candidate will:

| CF: 2.1 (S) | Use of available technology and software to support student learning. | F: 4,12 | I: 6 |
| CF: 2.2 (S) | Use technology to manage, evaluate and improve instruction. | F: 1,4,10, 12 | I: 6,7 |
| CF: 2.3 (K) | Know fundamental concepts in technology. | F: 12 | I: 1,6 |
| CF: 2.4 (K) | Understand fundamental concepts in technology. | F: 2,12 | I: 6 |
| CF: 2.5 (S) | Use fundamental concepts in technology. | F: 12 | I: 6 |

VALUES

• CF 3

• Through this focal area, the FAMU professional education candidate will:

| CF: 3.1 (S) | Work with colleagues in a professional manner. | F: 6 | I: 2,5 |
| CF: 3.2 (S) | Interact with students, families and other stakeholders in a manner that reflects ethical and moral standards. | F:11,6 | I: 9,10 |
| CF: 3.4(D) | Be committed to individual excellence. | F: 3,9 | I: 5,9 |

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CRITICAL THINKING

- CF4

• Through this focal area, the FAMU professional education candidate will:

<table>
<thead>
<tr>
<th>CF: 4.1 (K)</th>
<th>Understand a variety of instructional/professional strategies to encourage student development of critical thinking and performance.</th>
<th>F:4,7</th>
<th>I: 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF: 4.2 (S)</td>
<td>Use a variety of instructional/professional strategies to encourage students’ development of critical thinking and performance.</td>
<td>F:2,7</td>
<td>I: 4</td>
</tr>
<tr>
<td>CF: 4.3 (D)</td>
<td>Value critical thinking and self-directed learning as habits of mind.</td>
<td>F: 4</td>
<td>I: 1,4</td>
</tr>
<tr>
<td>CF: 4.4 (K)</td>
<td>Acquire performance assessment techniques and strategies that measure higher order thinking skills of student.</td>
<td>F:1,4</td>
<td>I: 1,8</td>
</tr>
<tr>
<td>CF: 4.5 (S)</td>
<td>Demonstrate the use of higher order thinking skills.</td>
<td>F: 8</td>
<td>I: 4</td>
</tr>
</tbody>
</table>

PROFESSIONALISM

- CF 5

• Through this focal area, the FAMU professional education candidate will:

<table>
<thead>
<tr>
<th>CF: 5.1 (K)</th>
<th>Know the content</th>
<th>F: 8</th>
<th>I: 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF: 5.2 (S)</td>
<td>Use the appropriate pedagogy to provide all students with the opportunity to learn.</td>
<td>F:7,9</td>
<td>I: 7</td>
</tr>
<tr>
<td>CF: 5.3 (D)</td>
<td>Demonstrate commitment to professional growth &amp; development.</td>
<td>F:3,7</td>
<td>I: 9</td>
</tr>
<tr>
<td>CF: 5.4 (K,S)</td>
<td>Use major concepts, principles, theories &amp; research related to the development of children and adults.</td>
<td>F: 7</td>
<td>I: 2</td>
</tr>
<tr>
<td>CF: 5.5 (S)</td>
<td>Construct learning opportunities that support student development &amp; acquisition of knowledge &amp; motivation.</td>
<td>F: 7</td>
<td>I: 5</td>
</tr>
<tr>
<td>CF: 5.6 (S)</td>
<td>Display effective verbal &amp; non-verbal communication techniques to foster valuable interaction in the classroom.</td>
<td>F: 2</td>
<td>I: 6</td>
</tr>
<tr>
<td>CF: 5.7 (S,D)</td>
<td>Display appropriate code of conduct including dress, language, and respective behavior.</td>
<td>F: 9</td>
<td>I:5,9</td>
</tr>
</tbody>
</table>

Overall Goals of the Course

The goals of this course are as follows:

1. To acquaint the student with the various techniques of teaching mathematics to secondary school students.
2. To acquaint the student with the means of incorporating technology and manipulatives into teaching techniques.
3. To investigate cooperative learning strategies as a teaching technique.
4. To develop skills in classroom management.
5. To encourage development of reading and writing skills in mathematics.
6. To provide opportunities for clinical experiences in connection with classroom activities.

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7. To acquaint the student with the code of ethics of the state of Florida, Department of Education.

**Specific Behavioral Objectives**

At the end of the course the student will have met these objectives with at least 80% proficiency.

2. Be able to demonstrate various teaching styles.
3. Be able to demonstrate the use of technology in teaching and testing.
4. Be able to develop a cooperative teaching model.
5. Develop a lesson plan that will demonstrate in of National and State standards.
6. Be able to discuss various aspects of classroom management and professional ethics.
7. Demonstrate understanding of the use of writing in mathematics and how it can be used in assessment.
8. Develop lesson plans that enhance reading and writing in mathematics.
9. Encourage problem solving as an effective teaching method.
10. Use assessment as a tool to improve teaching (student and self assessment).
11. Demonstrate an understanding of Professional Ethics.

**National, State, and PEU Standards Addressed in the Course**

**Interstate New Teacher Assessment and Support Consortium (INTASC) Standards**

**Standard 1: Subject Matter**
The teacher understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and can create learning experiences that make these aspects of subject matter meaningful for students.

**Standard 2: Student Learning**
The teacher understands how children and youth learn and develop, and can provide learning opportunities that support their intellectual, social and personal development.

**Standard 4: Instructional Strategies**
The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.

**Standard 5: Learning Environment**
The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.

**Standard 6: Communication**
The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.

**Standard 7: Planning Instruction**
The teacher plans and manages instruction based upon knowledge of subject matter, students, the community, and curriculum goals.

**Standard 8: Assessment**
The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social and physical development of the learner.

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Standard 9: Reflection and Professional Development
The teacher is a reflective practitioner who continually evaluates the effects of her/his choices and actions on others (students, parents, and other professionals in the learning community) and who actively seeks out opportunities to grow professionally.

Standard 10: Collaboration, Ethics, and Relationships
The teacher communicates and interacts with parents/guardians, families, school colleagues, and the community to support students' learning and well-being.

Professional Organization/Learned Society Standards

National Standards for Teaching Mathematics:
1. Worthwhile Mathematical Tasks
2. Teacher’s Role in Discourse
3. Student’s Role in Discourse
4. Tools for Enhancing Discourse
5. Learning Environment
6. Analysis of Teaching and Learning

NCATE/NCTM Program Standards for Secondary Mathematics:

Standard 6: Knowledge of Technology
Candidates embrace technology as an essential tool for teaching and learning mathematics.

Standard 7: Dispositions
Candidates support a positive disposition toward mathematical processes and mathematical learning.

Standard 8: Knowledge of Mathematics Pedagogy
Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.

Standard 16: Field-Based Experiences
Candidates complete field-based experiences in mathematics classrooms.

Florida Educator Accomplished Practices (FEAPs)

ASSESSMENT
The preprofessional teacher collects and uses data gathered from a variety of sources. These sources include both traditional and alternate assessment strategies. Furthermore, the teacher can identify and match the students' instructional plans with their cognitive, social, linguistic, cultural, emotional, and physical needs.

COMMUNICATION
The preprofessional teacher recognizes the need for effective communication in the classroom and is in the process of acquiring techniques which she/he will use in the classroom.

CRITICAL THINKING
The preprofessional teacher is acquiring performance assessment techniques and strategies that measure higher order thinking skills in students and is building a repertoire of realistic projects and problem-solving activities designed to assist all students in demonstrating their ability to think creatively.

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ETHICS
The preprofessional adheres to the Code of Ethics and Principles of Professional Conduct of the Education Profession in Florida.

HUMAN DEVELOPMENT AND LEARNING
Drawing upon well established human development/learning theories and concepts and a variety of information about students, the preprofessional teacher plans instructional activities.

KNOWLEDGE OF SUBJECT MATTER
The preprofessional teacher has a basic understanding of the subject field and is beginning to understand that the subject is linked to other disciplines and can be applied to real-world integrated settings. The teacher’s repertoire of teaching skills includes a variety of means to assist student acquisition of new knowledge and skills using that knowledge.

LEARNING ENVIRONMENTS
The preprofessional teacher understands the importance of setting up effective learning environments and has techniques and strategies to use to do so including some that provide opportunities for student input into the processes. The teacher understands that she/he will need a variety of techniques and work to increase his/her knowledge and skills.

PLANNING
Recognizing the importance of setting high expectations for all students, the preprofessional teacher works with other professionals to design learning experiences that meet students’ needs and interests. The teacher candidate continually seeks advice/information from appropriate resources (including feedback), interprets the information, and modifies her/his plans appropriately. Planned instruction incorporates a creative environment and utilizes varied and motivational strategies and multiple resources for providing comprehensible instruction for all students. Upon reflection, the teacher continuously refines outcome assessment and learning experiences.

TECHNOLOGY
The preprofessional teacher uses technology as available at the school site and as appropriate to the learner. She/he provides students with opportunities to actively use technology and facilitates access to the use of electronic resources. The teacher also uses technology to manage, evaluate, and improve instruction.

Florida Teacher Certification Examination (FTCE) Subject Area Examination (SAE) Competencies and Skills

14 Knowledge of instruction
1. Select appropriate resources for a classroom activity (e.g., manipulatives, mathematics models, technology, other teaching tools).
2. Identify methods and strategies for teaching problem-solving skills and applications (e.g., constructing tables from given data, guess-and-check, working backwards, reasonableness, estimation).

15 Knowledge of assessment
1. Identify students' errors, including multiple errors that result in correct or incorrect answers (e.g., algorithms, properties, drawings, procedures).
2. Identify appropriate alternative methods of assessment (e.g., performance, portfolios, projects).

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<table>
<thead>
<tr>
<th>Assignment</th>
<th>Behavioral objectives</th>
<th>INTASC Standards</th>
<th>Professional Organization</th>
<th>FEAPs</th>
<th>FTCE SAE</th>
<th>PEU Conceptual Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Experience / Observation (Activity)</td>
<td>Observe a teacher to see how the National and State standards are effectively applied in the mathematics classroom</td>
<td>INTASC: 1.0, 2.0, 4.0, 5.0, 7.0, 8.0, 9.0</td>
<td>NCTM: 16.1</td>
<td>FEAPs: 1.1, 2.1, 4.1, 7.1, 8.1, 8.1a</td>
<td>CF 3.4, CF 4.1, CF 4.3, CF 5.1</td>
<td></td>
</tr>
<tr>
<td>Quiz 1</td>
<td>Discuss the purpose of the State Standards, various aspects of classroom management, and professional ethics</td>
<td>INTASC: 1.0, 2.0, 4.0, 5.0, 7.0, 8.0, 9.0</td>
<td>FEAPs: 1.1, 2.1, 4.1, 7.1, 8.1, 8.1a</td>
<td>CF 3.4, CF 4.1, CF 4.3, CF 4.5, CF 5.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesson Plan</td>
<td>Develop a daily, weekly, and nine-week lesson plan that encourages problem solving, the use of technology, and real-life applications in mathematics.</td>
<td>INTASC: 1.0, 2.0, 4.0, 5.0, 7.0, 8.0, 9.0</td>
<td>FEAPs: 1.1, 2.1, 4.1, 7.1, 8.1, 8.1a</td>
<td>CF 3.4, CF 4.1, CF 4.3, CF 5.1</td>
<td></td>
<td></td>
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**Teaching Methods**

**Teacher** – The course will follow several techniques of teaching: lecture, demonstration, question and answer, cooperative learning, hands on activities.

**Student** – Students will engage in group activities and discussion, independent research, and activities involving the calculator, computer, and/or other tools. Students are to participate in presentations, prepare and present a 50 minute lecture to the class.

**Course Evaluation**

Your performance in the course will be evaluated as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Clinicals</td>
<td>15%</td>
</tr>
<tr>
<td>Critiques</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Lesson Plan</td>
<td>15%</td>
</tr>
<tr>
<td>Presentation</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Grading**

The final grades will be calculated on the following scale.

- 90% - 100% - A
- 89% - 80% - B
- 79% - 70% - C
- 69% - 60% - D
- Below 60 - F

**Course Policies**

**Policy Statement on Non-Discrimination** It is the policy of Florida Agricultural and Mechanical University to assure that each member of the University community be permitted to work or attend classes in an environment free from any form of discrimination including race, religion, color, age, disability, sex, marital status, national origin, veteran status and sexual harassment as prohibited by state and federal statutes. This shall include applicants for admission to the University and employment.

**Academic Honor Policy** The University’s Academic Honor Policy is located in the FANG Student Handbook, under the Student Code of Conduct - Regulation 2.012 section, beginning on page 55-56.

**ADA Compliance** To comply with the provisions of the Americans with Disabilities Act (ADA), please advise instructor of accommodations required to insure participation in this course. Documentation of disability is required and should be submitted to the Learning Development and Evaluation Center (LDEC). For additional information please contact the LDEC at (850) 599-3180.

**ATTENDANCE**

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The University Attendance policy is in effect. It is important that you attend class on time. This course is designed to promote professionalism and timeliness is a professional quality. Please be on time. **There will be no make up for late or missed assignments or presentation.**

The student is required to visit a middle or secondary mathematics class to observe/assist a model teacher. These clinicals will be done each week during the month of May. **Each student is required to present a 50 – minute lesson which will demonstrate at least two techniques of teaching and the use of a tool during the presentation of the lesson.**

Each student is required to hand in several written critiques of articles related to a given topic.

### Tentative Course Calendar

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
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<tbody>
<tr>
<td>Mon. May 12, 2008</td>
<td>Review of Syllabus</td>
</tr>
</tbody>
</table>
| Wed. May 14, 2008 | Introduction  
Discussion of National and State Standards                           |
| Fri. May 16, 2008 | School Visitation                                                        |
| Mon. May 19, 2008 | Clinical Reports                                                         |
| Wed. May 21, 2008 | Teaching Techniques                                                      |
| Thurs. May 22, 2008 | School Visitation: Visit a mathematics classroom. Observe how the teacher implements the National Standards in the classroom. |
| Fri. May 23, 2008 | School Visitation                                                        |
| Mon. May 26, 2008 | Holiday                                                                   |
| Wed. May 28, 2008 | Clinical Reports                                                         |
| Thurs. May 29, 2008 | School Visitation: Visit a mathematics classroom. Request a copy of the teacher’s daily lesson plan and observe the class discussion to determine if the teacher met the objectives as stated on the lesson plan. Also, state your role during the observation on the form provided. |
| Fri. May 30, 2008 | School Visitation                                                        |
| Mon. June 2, 2008 | Reading activity                                                         |
| Wed. June 4, 2008 | Accomplished Practices  
Cooperative Learning                                                           |
| Thurs. June 5, 2008 | Research Day                                                             |
| Fri. June 6, 2008 | Quiz I                                                                   |
| Mon. June 9, 2008 | Writing Lesson Plans  
Critique I is due.                                                          |

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Wed. June 11, 2008  Clinical discussion on lesson plans.  Teaching Topics are due.

Thurs. June 12, 2008  Research day

Fri. June 13, 2008  Using Technology

Mon. June 16, 2008  Using Technology activity (you will need a graphing calculator).

Wed. June 18, 2008  Classroom Management

Thurs. June 19, 2008  Research Day

Fri. June 20, 2008  Reports: History of Mathematics ________________
                   Blacks in Mathematics _______________________
                   Women in Mathematics _________________________
                   Professional Organizations ______________________ (15 mins. Each)

Mon. June 23, 2008  Ethics and Professionalism

Wed. June 25, 2008  Quiz II

Thurs. June 26, 2008  Research Day

Fri. June 27, 2008  Assessment / Lesson Plan draft outlines with teaching topics are due.

Mon. June 30, 2008  Assessment activity
                   Test Writing

Wed. July 2, 2008  Class discussion on Meier’s (1992) article

Thurs. July 3, 2008  Research day

Fri. July 4, 2008  Holiday

Mon. July 7, 2008  Reports: State organizations _______________________
                   Writing in Mathematics _________________________
                   Career options in Mathematics _____________________
                   Career options in Mathematics Education ____________

Wed. July 9, 2008  Class discussion on Bagley and Gallenberger’s (1992) article
                   Critique II is due.

Thurs. July 10, 2008  Research Day

Fri. July 11, 2008  Quiz III

Mon. July 14, 2008  Give back Quiz III and discuss

Wed. July 16, 2008  Preparation for Teaching Presentations

Thurs. July 17, 2008  Research Day

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Fri. July 18, 2008   Teaching Presentations Begin.
Final Lesson Plans are due.

References


www.nctm.org
www.ncate.org
www.fldoe.org

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