MA 470  Teaching Middle/Secondary Mathematics  Spring 2011
Professor:  Dr. Connie S. Schrock
Office:  SH 250 D  (620) 341-5631
Email:  cschrock@emporia.edu
Office Hours:  9:00 -10:00 AM MWF,  9:30 -10:30 AM TR, and by appointment.  Check to
make sure I do not need to leave to see student teachers.

TEACHING MATERIALS:
Manipulatives Kit EAI
Teaching Reading in Mathematics, 2nd Edition Barton and Heidema ASCD: Alexandria, VA.
Motivation Counts David R. Johnson Dale Seymour Publications
Ed Thoughts edited by John Sutton and Alice Krueger McRel
You are encouraged to join NCTM - http://my.nctm.org/membership/content.aspx?id=7618

COURSE DESCRIPTION:
During the next 16 weeks this course will help prepare you to teach mathematics in middle school
and high school.  We will focus on teaching skills specifically needed for this subject area.  We
will cover methods of teaching contemporary content in high school algebra, geometry, and
general and middle school mathematics.  Practical experiences in teaching college trigonometry
and basic algebra skills will be given.  Research in mathematics education, recommendations of
national committees, setting goals and writing objectives, selecting materials, diagnosis and
remediation, techniques of evaluation, working with parents, QPA/NCA, multicultural education,
special education and inclusion are topics which will receive specific attention.

CONCEPTUAL FRAMEWORK:
Emporia State University's faculty, including professional education and content area
faculty, support a program designed to transform candidates into professionals. To
help all students learn, the professional must have a command of content, critical ideas, and
skills, and the capacity to reflect on, evaluate, and learn from their practice so that it
continually improves. While there are different ways that successful professional educators can
be highly effective, six proficiencies emerge from a shared evidence-based understanding of
how to foster student learning. These six proficiencies define the Professional: providing
service to society; applying interdisciplinary
Candidates study, learn, and grow in an academic setting that integrates and highlights the connections among general studies, content studies, professional studies, and clinical experiences. Moreover, the candidate preparing for a career in the field of education or an allied health field is immersed in an academic milieu that values a number of tenets the faculty see as essential for the professional development and growth of teachers, other school personnel, and those in the helping professions: the value of diversity, the relevance of authentic assessment, the essentials of professionalism, the importance of collaboration, the usefulness of technology, and the power of reflection. ESU’s professional education programs as well as the non-professional education programs offered within The Teachers College devote themselves to the proposition that candidates who learn and grow in such an atmosphere and who integrate knowledge, theory, and practice demonstrate the proficiencies of the Professional at the time of program completion.

**COURSE GOAL:**
To educate pre-service secondary teachers in the methodology of teaching mathematics in the secondary school and to provide actual teaching experiences in the MA 112 and MA 098 courses as well as in this course.

**COURSE OBJECTIVES (coded to the TC Outcomes reference on back pages):**
1. Students will demonstrate the ability to organize and present mathematical ideas in various teaching styles. (K12, P1, P2, P3, P5, P13, P15)
2. Students will demonstrate the ability to identify and construct evaluation instruments appropriate for assessing student learning of skills, concepts, facts, and problem solving. (P6, P8, P14)
3. Students will become familiar with a variety of alternative assessment techniques including performance assessment, writing, portfolios, questioning, and observation. (P6, P8, P14)
4. Students will demonstrate the ability to diagnose problem areas and prescribe remedial activities in mathematics for students at all levels of ability. (P2, P3, P6)
5. Students will demonstrate the ability to identify instructional materials used in the teaching of mathematics. Specific attention will be given to manipulatives and materials that will enhance learning for all. (K1, P7, P13, P18, D3, D10)
6. Students will be made aware of the multicultural society in which he or she will teach and the importance of teaching so that all students, regardless of ethnicity or gender, will have equal opportunities for success. (K1, K10, P5, P7, P13, D2)
7. Students will demonstrate the ability to identify professional mathematics organizations and describe their contributions to the teaching of mathematics. (P16, P17, D6)
8. Students will demonstrate the ability to identify and apply current and emerging trends in secondary mathematics education. (K7, K8, K9, P2, P15)
9. Students will evaluate and adapt technology for use in the mathematics curriculum. (K11, P11, D3)
10. Students will understand what is meant by inclusion and possess skills to deal with special education as it impacts the mathematics classroom. (K1, K10, P5, P7, P13, D2)

COURSE EXPECTATIONS:
It is expected that you will attend class every day. If you are ill and cannot attend you are expected to call in just as if student teaching or working. After two unexcused absences your grade will be dropped one letter grade. After four unexcused absences it will be recommended that you drop the course. Tuesday and Thursday we will be teaching the Trigonometry course or the Intermediate Algebra course. If you are not teaching, you will watch and evaluate the teacher. Read all handouts that pertain to teaching of Trigonometry or Intermediate Algebra. You will work very hard. This is a 400 level course and much is expected of you. Now is your last chance to prepare for your successful student teaching experience and professional career. If you are late to class frequently, you will be expected to withdraw from this course.

COURSE PROCEDURES:
As a class member you will be expected to create clear well written lesson plans and provide excellent presentations covering specific topics assigned. During the course of the semester you will use many teaching techniques. The major task assignments are outlined here and will be explained in greater detail prior to the deadlines. We will also have many class discussions over your reading assignments. Participation is required, as is respect for your peers and their opinions.

CONTENT:
Checking competencies required for the grade levels you will teach; communicating with students and parents; methods of selecting and presentation of material; teaching basic skills; teaching abstractions; individual differences and needs; exceptional child; inclusion; multicultural problems and solutions in education; writing goals and objectives; strategies in teaching concepts and content; diagnosis and remediation of students deficiencies; problem-solving; mathematical modeling; nature of proof; test construction; evaluation of student performance; national groups associated with math teaching; familiarization with NCTM Journals and Standards; study of and presentation of traditional topics from (1) Middle School Math, (2) General Math, (3) Algebra, (4) Geometry, and (5) Trigonometry. Other topics given special attention are problem solving, estimation, mental mathematics, calculator and computer use, and software evaluation.

COURSE EVALUATION:
Tests, final exam, class participation, personal portfolio, individual projects and tasks, individual teaching projects, teaching performance in MA 112 (or MA 098) and competency exams in four
subject areas. The portfolio can change your final grade by 4% either up or down. Assignment of points is as follows:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
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<tbody>
<tr>
<td>Homework Assignments (includes journals)</td>
<td>300</td>
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<tr>
<td>Tasks Assignments</td>
<td>550</td>
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<tr>
<td>Quizzes and/or Exams</td>
<td>300</td>
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<tr>
<td>Practice Teaches</td>
<td>500</td>
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<tr>
<td>Teaching Trigonometry Class / Intermediate Algebra</td>
<td>200</td>
</tr>
<tr>
<td>Trigonometry / Intermediate Algebra Final</td>
<td>100</td>
</tr>
<tr>
<td>Methods Final</td>
<td>100</td>
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<tr>
<td>TOTAL</td>
<td>2050</td>
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The plus/minus system will be used for borderline grades. The scale is as follows: 90% - 100% A, 80% - 89% B, 70% - 79% C, 68% - 69% D, 0 - 67% F.

**PORTFOLIO:**
The portfolio is a showcase of your achievements. It is a place where many types of assignments, projects, reports, and writings can be collected. It is a way of demonstrating abilities you may not be able to demonstrate on tests, quizzes, and regular homework assignments. Your portfolio should show progress, quality projects, and indicators of your thinking about the teaching of mathematics. Your cooperating teacher should be able to look at your portfolio and be able to tell what kind of student teacher you will become. Material may be taken from any class as long as it relates to the standard you are documenting. It is not worth a specific amount of points since most of the items included have been evaluated on a point system already. The portfolio will be evaluated on your interpretation, presentation, organization and content. The portfolio can raise or lower your overall grade by 0% to 4%. The portfolio is a course requirement and must be completed on time in order to pass the course. (Any specific problems with the deadline can be discussed with me before the due date.) The portfolios will be divided into 4 groups; outstanding(+3 or 4%), good(+.5 to +2%), average 0% and below average(-.5 to -4%). The following should be included in your portfolio.

1. A cover letter explaining what you believe are the three most important traits needed in a mathematics teacher.
3. Four journal entries from the semester from class or printed from an electronic entry or a reflection page.
4. Work to demonstrate your ability to productively meet state outcomes for licensure. Select material that shows your ability to meet each of the nine outcomes. Documentation that explains to the reader why the selections you have made meet the outcome. At least 3 indicators must be documented to be considered in the average category, at least one from each area (knowledge and performance).
5. A section of your own creation that shows how you will be a great teacher.

The portfolio is due **April 29, 2011.**
JOURNALS (P16, D1, D3, D12):
Often a question will be placed on Blackboard - http://elearning.emporia.edu/. Some questions you will be asked for a response but most will be an electronic discussion where you will be expected to post discussion responses and respond to others in your class. More details will be given as class progresses. Most of your task assignments will be posted electronically after they are submitted on paper.

TASK ASSIGNMENTS:
The major assignments in this class are listed as task assignments. It is your responsibility to plan your time in order to complete these assignments successfully by the deadline. Each one will be discussed in more detail closer to its deadline. No last task assignments will be accepted late unless you use the coupon. There will be one late coupon given to you for task assignments. You may be up to one week late when you attach the coupon. This is to be used for unforeseen problems at the due date. Since all of the dates are given to you in the syllabus you should be able to plan in advance to meet the deadlines. If you do not use the coupon and all task assignments are submitted, you may turn it in with your portfolio for 10 bonus task points. If you lose the coupon it will not be replaced.

TASK 1 (K5):
There are four competency exams that must be passed with 90% accuracy for secondary education methods. Each exam will cover one of the four areas of mathematics that are in the state standards.
The areas are Number and Number Systems, Algebra, Geometry, and Data. If you have not had probability and statistics, you will need to study for the data test. The tests do not assess college mathematics but they do assess what you will teach.

These exams will cover skills and concepts. You may prepare by reviewing some of the textbooks I have in the office. They may be checked out for up to one week. The exams will be given when the math lab is open or by special arrangement with me. You will let me know in advance when you want to take the test. If you do not get a 90% by the third test, the score will be reflected in this task. A final score of 50 - 85 will give you 50% of the points on the test. A score of less than 50% will give you 20% of the points. Not taking one of the tests will give you a 0. A score of 86-89 will give you that percent and a score of 90% or better will give you 100% of the points. These must be completed by April 20, 2011. They are not easy, don't wait until March to start. (200 points)

TASK 2 (K5, P5, P13):
"I have" is a mental math activity. I will show you one of these and a few more examples of mental mathematics activities. You may create one of those for a certain subject or level or, better yet, find a different mental mathematics activity. Whatever you create the goal is mental
mathematics. Any errors in the task must be corrected and then posted on blackboard to get the points you earn when the project is graded. (25 points)
Due: January 26, 2011

TASK 3(K5, P5, P13):
One of the problems that I noticed while on sabbatical was a lack of computation skills at all levels. Many teachers resort to timed tests even at the high school level. There are better ways to work on computation skills. This is a similar task to the mental math task but I want you to find a fun and time effective way to work on computation skills. They can be with basic facts, fractions, decimals or any other computation skill. You do not need to make up a new activity but you do need to reference your source. Since there is never enough time to teach everything the activity should also meet another necessary objective for example problem solving. Make sure the grade or class is listed and that the activity is appropriate to that grade. (50 points)
Due: February 9, 2011

TASK 4 (K1, K9, K12, P5, P7, P15, D2, D7):
Multicultural education is a concept, an educational movement, and a process whose goal is to change the structure of educational institutions so that male and female students, exceptional students, and students who are members of diverse racial, ethnic and cultural groups will have an equal chance to achieve academically in school (James A. Banks, University of Washington). Ethnic minorities currently make up the majority of the school population in 25 of the largest cities in the U.S. Minorities constitute majorities in 50 major cities. Even in Kansas’s classrooms, the ethnic population is growing and our future is dependent on educating all students. Start by reading current articles that provide information on how to better teach a diverse class. All of your research cannot be found on the internet. Some hardcopy sources must be sighted. You must also include three article summaries. The summaries should have the complete reference at the top of the page, one paragraph summarizing the article and one paragraph reaction to the article. Next, you are to develop a mathematics lesson plan to teach all students. The lesson plan must include the outcome and indicator that it addresses in the Kansas Math Standards. This activity must be supported by research and clearly documented as to how it pertains to multicultural education. Make sure you write it in complete detail so that your peers could replicate it. Any handouts or directions needed for the lesson must be included. You will describe it to your classmates. We will give anyone that wants a copy a chance to copy it. Make sure your project is worth your peers copying it. (50 points)
Due: February 25, 2011

TASK 5(K1, K9, K12, P5, P7, P15, D2, D7):
Our goal is to help all students learn. Currently an education goal is to reduce the amount of time special students spend in special classrooms and provide them the opportunity to learn in the
least restrictive environment. Therefore, these students are included in the regular classroom. You will research their needs and different methods for helping all students to learn mathematics. You will be able to discuss the IEP and how it impacts you and your classroom. We will also discuss the skills you need to successfully work with other teachers, paraprofessionals, administrators, and parents. For this task you will read and write article summaries on four articles. The summaries should have the complete reference at the top of the page, one paragraph summarizing the article and one paragraph reaction to the article. Try to find articles that will help you in the classroom. You will be provided with a list of resources where you make start. Only two of your sources can be from the internet. The second part is to use the extremely traditional lesson plan that I give you and improve it to help a variety of learners. You will describe three imaginary students with three different needs that you are trying to help. You must make note of modifications or accommodations you make in the lesson and why. Use the research you have found to support the changes you make. (50 points)
Due: March 30, 2011

TASK 6(P4, P10):
Visual aids and an attractive classroom are important at every level. You will make a visual aid (i.e., bulletin board, long sign for above the chalkboard, wall decoration, table display, etc.) This shall be a learning devise as well as attractive. Along with the display you should turn in a description of the aid (good enough that one of your classmates could replicate the aid without seeing yours) and of how you would use it mathematically. This should typed. Make sure the instructions are clear enough that anyone can make the same aid based on your directions. This will also be posted on blackboard for any student that wishes to copy it. The rubric I will use for evaluation will be given to you early in March. You will bring your display to class on the due date and we will review all presentations for possible errors. (50 points) Due: April 6, 2011

TASK 7(P13):
You must know what resources are available and have an idea of what you want to purchase if given the opportunity. Assume you have $300 for your first year. Assume I am your principal and you will leave me the information to look over and order during the summer. Include all I would need to know. Make a list of what you would purchase and where you could find it. I have 15-20 catalogs in my office that you can check out to use or use the two I gave you earlier in the semester. This is the only task assignment where you will not have the grading rubric in advance. (25 points) Due: April 18, 2011

TASK 8(K17, P8, P10, P12, P18, D2, D7, D11, D12):
This task involves teaching "real" students. You will be given the chance to work with middle school students as a part of the Quest program. Again this year one of the opportunities will be to create a math family night at Emporia Middle School for students and their parents. It is a
plus to get a chance to interact with parents as well. We will create a math trail with station based tour through the building where the students do an interesting, challenging or fun activity at each station. You will submit a written self-evaluation for the project. Tuesday, March 8 will be the date for this year. This is an opportunity that is impossible to replicate. Make sure you get off work immediately. If you have a night class you talk to your professor ASAP. Let me know if you need a note or help from me. (100 points)

HOMEWORK/PRACTICE LESSONS:
There will be many assignments that will be made as we progress through the class. It would be rare to have only one outstanding assignment at a time. Teachers must be able to do many tasks at once. You will be keeping up with many lessons as well as your work in your other courses. You will receive one coupon to use for a late homework assignment. If it is not used and all assignments are submitted you will be able to turn it in with your portfolio for 10 homework points. All lesson plans must be done before you teach so they cannot be submitted late.

NCTM ANNUAL MEETING Indianapolis, Indiana (P16, P17, D6, D12)
There is an opportunity to attend the NCTM Annual Conference in Indianapolis April - 13 - 16, 2011. I believe involvement in professional organizations is essential. I will be inviting all of the students that are student teaching and anyone in this course. You will have to pay for your expenses; membership in NCTM, registration, shared hotel room, transportation and food. The sign-up sheet is on my door. I have made some preliminary hotel reservations. I will need to know if you want to attend by mid February.

MA 098 Intermediate Algebra (Elementary/Middle School Endorsement): (K14, K17, P5, P7, P8, P11, P12, P13, P14, P15, P16, D3, D7)
You will start in the Trigonometry class with the secondary students. You will watch the others teach and then move to the MA098 class on February 3. You will be assigned approximately four times to teach and a quiz or 2 to make and grade. At least two of the times you will teach in a team teaching situation. Be sure to read all preparation materials. This course meets at the same time MA 112 meets so you will meet there with Dr. Harrell; class is 8:00 - 9:00. Then you will visit about the lessons. The room number is SH 44. Dr. Harrell is responsible for this course so all planning and evaluation of this section will be done with him. He will write a final exam that you will take in this course. (200 points teaching - 100 points exam)

TRIGONOMETRY (middle or secondary math only): (K14, K17, P5, P7, P8, P11, P12, P13, P14, P15, P16, D3, D7)
You will be assigned three teaching times for the course and one teaching time in MA098. Two of the times you will teach in a team teaching situation. Be sure to read all preparation materials. You will also be assigned to a team to make one of the exams for the trigonometry class and one of the quizzes. I will make the final that all of you take. You will grade the homework, quiz and exam that you assign. We will stay until 9:20 in the trigonometry room (SH 247) to discuss the
lesson, hand in evaluations and prepare for the next class period. (200 points teaching - 100 points exam)

"Emporia State University will make reasonable accommodations for persons with documented disabilities. Students need to contact the Director of Disability Services and the professor as early in the semester as possible to ensure that classroom and academic accommodations are implemented in a timely fashion. All communication between students, the Office of Disability Services, and the professor will be strictly confidential."

Cheating will not be tolerated and any act of dishonesty may be grounds from dismissal from the teacher education program or the University.

This will be a busy semester and hopefully an enjoyable one. Good Luck.

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<tr>
<th>Methods Final:</th>
<th>Tuesday, May 10, 2011 10:10 am</th>
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<tbody>
<tr>
<td>Trig / Algebra Final:</td>
<td>Friday, May 13, 2011 8:00 am</td>
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Knowledge, Skills, and Dispositions for New Conceptual Framework

Candidates exhibit knowledge of (Reverenced as K)
1. characteristics of diverse learners.
2. legal issues and ethical standards that apply to sound educational practices.
3. educational strategies that support the learning for students from diverse cultural and linguistic backgrounds.
4. general education within an intellectual framework.
5. subject matter content and content-specific pedagogy that inform the basis for entitlement to practice.
6. philosophical, historical, social, and theoretical foundations of education.
7. on-going developments in subject matter content, curriculum planning, instructional theory and practice, classroom management, and assessment.
8. teaching and learning as a dynamic, constructive, and metacognitive process.
9. a repertoire of teaching and learning strategies, designed to help students increase their power as learners.
10. ever changing educational needs of students living in a global society.
11. appropriate technology and how it may be used to enhance teaching and learning.
12. various instructional strategies that can be used to meet the needs and learning styles of individual students.
13. theories of human physical, cognitive, social, and emotional development.
15. a variety of assessment strategies to diagnose and respond to individual learning needs.
16. professional ethics and standards for practice.
17. teamwork and practices for creating healthy environments for learning and teaching.
18. Effective communication techniques in order to develop a positive learning environment.

Candidates demonstrate practical ability to (Reverenced as P)
1. Integrate and use concepts from their general, content, and professional studies in their educational environment.
2. Demonstrate professional performance that incorporates theory, research, and practice in order to help all students learn.
3. Implement non-biased techniques for meeting needs of diverse learners.
4. Integrate knowledge across and within disciplines.
5. Use knowledge of subject matter content and instructional strategies to meet the widely-diverse needs of the students they educate.
6. Determine and assess what students need to know and be able to do in order to succeed.
7. Utilize creative planning and curriculum integration to promote learning of all students.
8. Create learning experiences commensurate with a student’s level of readiness.
9. Assess their educational practices, modify their assumptions and actions, and expand their repertoire of skills.
10. Use and support effective communication techniques in order to develop a positive learning environment.
11. Make use of appropriate technology to support student learning.
12. Integrate effective behavior management into all interactions with students.
13. Apply a variety of instructional strategies and materials to promote student learning, critical thinking, and problem solving.
14. Employ appropriate assessment techniques in order to measure student performance and growth.
15. Develop a storehouse of learning strategies that help students understand and integrate knowledge.
16. Respond respectfully to ideas and views of others.
17. Recognize and appropriately respond to the need for on-going self-development and professional development in response to professional standards of practice.
18. Utilize student learning standards to promote student learning and achievement.

Candidates exhibit dispositions that exemplify (Reverenced as D)
1. Professionalism and ethical standards.
2. Respect for cultural and individual differences by providing equitable learning opportunities for all students.
3. A willingness to think critically about content, curriculum planning, teaching and learning pedagogy, innovative technology, and assessment.
4. The belief that educating children and adults requires the integration of multiple kinds of knowledge.
5. A desire to analyze concepts, evaluate clinical practices, experiment, and initiate innovative practices as needed.
6. A commitment to life-long learning by participating in professional organizations and by keeping current with research in their field.
7. a commitment to challenge all students to learn and to help every child to succeed.
8. an awareness of the larger social contexts within which learning occurs.
9. a commitment to self-reflection to recognize in all students human physical, cognitive, social, and emotional development.
10. a belief that curriculum planning and teaching practices be meaningful, engaging, and adapted to the needs of diverse learners.
11. a desire to collaborate with colleagues, parents and community members, and other educators to improve student learning.
12. a willingness to learn from other professionals in the field.