Mat 5441 Methods & Materials for the Teaching of Secondary Mathematics

Credit, 3 sem. hrs.

Prerequisite: Graduate standing and intent to teach in Mathematics

This course will acquaint pre-service secondary teachers with current national and state curriculum expectations and current issues related to teaching secondary mathematics.

Emphasis will be placed on using manipulative materials; graphing and scientific

calculators; and computers and software to teach mathematics. Requirements for 7-12 mathematics licensure in Mississippi will be addressed.

Rationale

Prospective secondary mathematics teachers must be prepared to be learners as long as they are teachers. Methods and technology are changing at such a rapid pace that students must be made aware of what has changed since they were secondary students and where to obtain current information about innovative instruction techniques, new technology and content. The course is designed to give students multiple opportunities to have peer evaluation of in-class presentations.

Professor

\_\_\_\_\_\_\_\_\_ Office: 3\_\_ MCC email\_\_\_\_\_\_\_\_@mc.edu

Office Hours: TBA

Learning Objectives

The students will:discuss requirements of and write reflective lesson plans to illustrate the Common Core

Standards

discuss requirements of and write reflective lesson plans to illustrate of the Mississippi

Curriculum Structure

discuss requirements of and write reflective lesson plans to illustrate of the Focal Points of the National Council of Teachers of Mathematics (NCTM)

discuss of and write reflective lesson plans to illustrate the Principles of secondary mathematics instruction (NCTM)

prepare a lesson plan unit (evaluated by INTASC guidelines)

demonstrate knowledge of current mathematics education vocabulary by using it.

Vocabulary will include but not be limited to:

product/process assessment cooperative learning exploration

JRME portfolio NAEP

graphing calculator manipulatives symbolic manipulator

contructivism behaviorism model

paradigm algorithm discovery learning

gender equity equity software

learning styles strategies alternative assessment

spiral curriculum equity FIMSS

list professional organizations that provide mathematics education resources - NCTM, MCTM, MAA, etc.

explain concepts of learning theories about mathematics

write a personal philosophy of mathematics learning

write, plan, and teach lessons demonstrating use of current method trends

teach using lesson plans provided

evaluate lessons taught during class

demonstrate use of manipulatives - including pattern blocks, algebra tiles,

geoboards, tangrams, polydrons, measuring devices, etc.demonstrate ways to use technology in various mathematics subjects

demonstrate competent use of available software such as Mathematica, Geometers

Sketchpad, Statdisk, etc.

evaluate student errors

Academic Integrity

Honesty and integrity are basic virtues expected of all students at Mississippi College. The Mississippi College Undergraduate Catalog) list the policies and penalties for plagiarism and cheating. See the Mississippi College Tomahawk for specific information regarding penalties. On tests, quizzes, and individual out-of-class projects, the work is assumed to be the student’s own and no cheating will be tolerated.

Outline of Topics

Student teaching requirements -

Learning theories and styles

Curriculum sources – Common Core Standards, Focal Points, MS Curriculum Structure, etc.

Assessment of student progress- alternative, performance based, writing mathematics

Planning for teaching – writing lesson plans for large group, small group, individuals

Teaching diverse student populations - equity issues

Skills in Teaching Mathematics-questioning, motivation, vocabulary, discipline, cooperative learning

Teaching utilizing technology

Teaching problem solving/critical thinking skills

Discovery/Proof

Teaching General Mathematics

Teaching Algebra I & II

Teaching Geometry

Teaching Pre-Calculus/Calculus

Methods of Instruction

The methods of instruction include class discussion of text and journal articles, lecture, class demonstration (both student and teacher), student presentations, video presentations, modeling using manipulatives, technology demonstrations (graphing calculators and software), and group problem solving (both large and small). Each student is expected to have a text, other required materials, writing materials, and a graphing calculator.

Required Practices

Students will regularly write in a math journal, write summaries of journal articles weekly, demonstrate manipulative use, complete written homework assignments, communicate via email, use the Internet, utilize software, participate in discussions, write a unit, present the initial activity of at least three lessons to the class, observe for five hours in a middle school mathematics classroom, observe for five hours in a secondary mathematics classroom, and write two tests, a midterm and a final. Graduate students will read and summarize one of the NCTM Yearbooks at the discretion of the professor. The final examination will be given

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Instructional Materials

Text: Teaching Secondary and Middle School Mathematics by Daniel J. Brahier.

978-0-205-56919-9

Additional Required Materials:

Mississippi College Teacher Education Handbook

NCTM student membershipAssessment

Assessment of students’ progress will be made based on total points accumulates through the following activities: homework (5-10), journal writing (25), professional journal article summaries(10 each), a midterm examination (100), a final examination(100), class participation (25), group problem solving (5-10), individual problem solving (5-10), three or four lesson presentations(25), lesson plan unit (100), book report (25) and software use (5-10). Final grades will be

made on percent of total points as follows:

90-100% of the total points = A

80-89% of the total points = B

70-79% of the total points = C

60-69% of the total points = D

less than 60% of the total points = F.

Other Policies

Attendance: You are expected to be in class on time and prepared! The college

stipulates that the grade for the course is an F in the event of 12 or more absences in a MWF class. Tardiness to class will result in a 0 for the daily grade if a quiz was missed or homework was collected unless the student provides an acceptable reason for class disruption. If a student is tardy, they must see Dr. Floyd immediately after class with a reason to change the recorded absence to tardy.

Final day to add the class is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Final day to drop the class is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Make-up work: This is the responsibility of the student and should be cleared with Dr. Floyd in advance when possible (i.e.: athletes, student activities, etc.). Students are responsible for all material covered and all assignments given when they are

absent. (You should have homework completed whether or not you attended the

previous class meeting.) Make-up work will only be allowed for approved absences. It must be completed within one week of returning to class unless otherwise scheduled.

Special Accommodation: In order for a student to receive disability accommodations under Section 504 of the Americans with Disabilities Act, he or she must schedule an individual meeting with the Director of Student Counseling Services immediately upon recognition of their disability(if their disability is known they must come in before the semester begins or make an appointment immediately upon receipt of their syllabi for the new semester). The student must bring with them written documentation from a medical physician and/or licensed clinician that verifies their disability. If the student has received prior accommodations, they must bring written documentation of those accommodations (example Individualized Education Plan from the school system). Documentation must be current (within 3 years).The student must meet with SCS face-to face and also attend two (2) additional follow up meetings (one mid semester before or after midterm examinations and the last one at the end of the semester). Please note that the student may also schedule additional meetings as needed for support through SCS as they work with their professor throughout the semester. Note: Students must come in each semester to complete their Individualized Accommodation Plan (example: MC student completes fall semester IAP plan and even if student is a continuing student for the spring semester they must come in again to complete their spring semester IAP plan). Student Counseling Services is located in Alumni Hall Room #4 or they may be contacted via email at rward@mc.edu. You may also reach them by phone at 601-925-7790.

Reading List

Read two articles (not a letter to the editor or a short feature column) from an NCTM journal (Mathematics Teacher, Arithmetic Teacher, Teaching Children Mathematics, Mathematics Teaching in the Middle School or Journal for Research in Mathematics Education) on each of the topics listed below. Reference the article as illustrated at the top of a page and write a summary of about one page due at the beginning of class on the date listed. Please write the date and your name in the upper right corner of the page. Late articles will lose points. If the article is not on topic it will earn a zero. Concise summaries written neatly or typed are expected.

[ Hint: Locate several articles at once, then copy/download them to read and summarize when you have time. It may be easier to flip through the journals than to do an electronic search. Do skim the article before you select it to summarize. Some articles will be easier for you to summarize than other.

Form for the citation is:

Surname, First name Initial. “Title.” Journal name volume number (Month year): page numbers.

Example of a citation is:

Anderson, Cindy L., Kevin M. Anderson, and Edward J. Wenzel. “Oil and Water Don’t

Mix, but They Do Teach Fractions.” Teaching Children Mathematics 7 (November 2000): 174-178.

 Date Topic

September teaching some algebra or pre-algebra topic

September technology use in a mathematics classroom

September any article an NCTM Yearbook, 1995-2009

September writing in the mathematics classroom

September assessment article

October teaching some geometric concept other than area/volume/measurement

October teaching problem solving or critical thinking

October using exploration/discovery to teach a concept

October your choice from the Journal for Research in Mathematics Education (JRME)

November teaching percent or fractional computation

November teaching operations with integers

November teaching area, surface area of volume

December some topic in advanced algebra or trig

December any article from any NCTM Journal