

The University of Southern Mississippi
College of Science and Technology
Department of Mathematics

Secondary Mathematics Methods
Lecture and Laboratory
MAT 457/457L SYLLABUS
Fall 2005

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Office Hours: MWF 8:00 – 8:50
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or by appointment

Prerequisites: CIS 313, MAT 280, 285, 326, and 340, PSY374

MAT 457	Lecture	3 hours credit	Required undergraduate	Offered only in the fall
MAT 457-L	Lab/practicum	1 hour credit	Required undergraduate	Offered only in the fall To be taken with MAT 457

MAT 457 and MAT 457L, the Secondary Mathematics Methods course and Lab are to be taken after completion of the general methods course (CIS 313) and prior to student teaching.

Text: Huetinck, Linda and Munshin, Sara N., TEACHING – Mathematics for the 21st Century: Methods and Activities for Grades 6-12, 3rd edition, Upper Saddle River, New Jersey: Merrill-Prentice Hall.

Supplemental Material: Sims, Rod A., and Sims, Charles E., Middle School Mathematics – A Survival Guide to Improved Instruction, The Regency Group.

Catalogue description:

MAT 457: A course designed to give students a knowledge of objectives, curriculum problems, and organization and methods of teaching secondary-school mathematics.

MAT 457L: A practicum with a minimum of 15 contact hours in a school setting and a minimum of 10 hours in-class hours learning to use appropriate manipulatives and technology for grades 7-12. (NCTM 16.1, 16.3)

Conceptual Framework:

The overarching theme of the College of Education and Psychology and NCATE Unit conceptual framework is “**Freeing the Power of the Individual.**” The Unit’s conceptual framework is by design aligned with the university’s mission. The conceptual framework is consistent with the university’s historical roots as a normal college and with the university’s future. The University, since our founding in 1910, has been committed to outstanding preparation of teachers, counselors, administrators, and other school personnel. In accordance with this history

and the present vision of the University, the mission of the Unit is seven-fold: a) preparing Mississippi teachers; b) promoting cutting-edge research; c) creating a healthier region; d) leading in economic development; e) taking Mississippi to the world; f) enhancing the cultural environment; and g) educating the whole student (University Mission). Within these mission statements, the Unit has embedded the knowledge, skills, and dispositions to enable its members to prepare effective educational leaders to serve a variety of roles in the P-12 setting. With this in mind, the outcomes in the areas of knowledge, skills, dispositions, and diversity goals all educational leaders graduating from The University of Southern Mississippi are to possess include the following. Within these outcomes lie the expected target competencies for all professional education students, encompassing the vision and mission of the Unit.

Power of Knowledge to Inform
Power to Inspire
Power to Transform Lives
Empower Community of Learners

MAT 457/MAT 457L General Goals: These classes are designed to help you be a more effective and productive teacher. The basic idea is to offer you opportunities to develop confidence in your ability to teach mathematics on the secondary level. These courses will assist you in *freeing the power of the individual* (yourself) to transform lives, to inspire, to inform, and to empower a community of learners.

MAT 457/MAT 457L Course objectives: At the end of these courses students will:

1. Write lesson plans appropriate for the mathematics classroom, including measurable objectives in line with the NCTM Standards and the Mississippi Mathematics Framework. (INTASC 2, 3, 4, 7, NCTM 7.1, 7.2, 7.4, 8 all)
2. Become familiar with Mathematical Journals as a resource for use in their classroom. (INTASC 9, NCTM 8.5)
3. Investigate past and present trends in mathematics education.
4. Become familiar with a variety of types of technology as appropriate for the secondary classroom. (NCTM 6, 10.5)
5. Build a repertoire of strategies useful for dealing with classroom management situations. (INTASC 5, NCTM 1.4, 7.3, 7.5)
6. Evaluate themselves in their effectiveness in presenting mathematical lessons through reflective journal writings and peer critiques. (INTASC 6, NCTM 1.4, 7.3, 7.4, 3 all)
7. Be familiar with a variety of types of assessment including means of alternative assessment. (INTASC 8, NCTM 1.4, 7.5)
8. Be able to use different size class grouping effectively in the classroom environment. (INTASC 3, 4, 5, NCTM 7.4)
9. Become more familiar with the classroom environment in general and specifically with the teaching process. (INTASC 1, NCTM 16.1, 16.3)
10. Build a “tool box” of manipulative and technology activities appropriate for the secondary mathematics classroom. (INTASC 2, 3, 4, NCTM , 1.3, 5 all, 7.6, 10.5)
11. Prepare and present lessons on topics from current secondary text incorporating the use of problem solving, appropriate technology, and/or manipulatives. (NCATE 1.1, 1.2, 4.1, 4.3)

MAT 457 Major Topics Covered:
History and Introduction to Reform

Learning, Motivation, and Basic Management Skills (INTASC 5, NCTM 8)
Concrete to Abstract with Tools, Manipulatives, Computer Programs, and Calculators (INTASC 2, NCTM 5, 6, 7)
Standards Based Curricula (INTASC 3, 4, NCTM 7)
Refined Geometry and Algebra (NCTM 10.5, 11)
Planning Instruction (INTASC 7, NCTM 8)
Promoting Communication in the Classroom (INTASC 6, NCTM 3)
Assessing Individual Student Performance (INTASC 8, NCTM 7.5)
Equity (INTASC 3, NCTM 7.1)
Communicating with Parents and Community (INTASC 10, NCTM 3.1)
Professional Growth (INTASC 9)

MAT 457 Course Policies:

1. Class attendance is very important. Part of this course is your learning from others as you observe their teaching effort. Your own “teaching days” will improve as you evaluate and consider the effectiveness of all lessons taught. Therefore, it is imperative that you attend class regularly in preparation to become a “full-fledged teacher”. Each student is given fifty (50) points for attendance. You will be allowed to miss one (1) day without penalty after which ten points (10) will be deducted for each class period you miss for any reason, excused or unexcused. If you are tardy, two (2) points will be deducted. It is **YOUR** responsibility to get the “absence” removed **THAT SAME DAY**. Otherwise, the absence remains.
2. Each student is expected to be prepared appropriately for class and to participate in the teaching activities of all students.
3. Assignments are expected to be turned in on time. Late assignments will be penalized 10% of the value of the assignment.
4. Students are expected to take tests at the time they are scheduled. No make-up test will be given. If you have an emergency, contact me **BEFORE** the test and I will try to be humane and schedule an alternative test time. If a test conflicts with a University approved activity, see me in advance to arrange an alternate, earlier test time. Once test are returned to the class, no make-up test can be taken.
5. A student will not be allowed to drop this class after Monday, September 29, the **LAST DAY TO DROP A CLASS WITHOUT ACADEMIC PENALTY** unless the student is withdrawing from the University (all classes).

MAT 457 ASSIGNMENTS:

1. Due August 26: You will write a short autobiography giving information about yourself, your family background, where you went to high school, what your career plans and goals are, what your major is and why you want to teach mathematics. There is no grade for this assignment, but it will help us to get to know each other better. This will also be used for your practicum assignment. (NO GRADE)
2. You will be expected to keep a notebook for this course. In your notebook you should have sections for reflective journals, class notes, answers to the questions from the text, your article

critiques, handouts from the teaching assignments, and current periodical articles pertaining to teaching. You will turn your notebook in on December 2nd.

MAT 457 Notebook Checklist Fall 2003

Name _____

(50 points)

Reflective Journals (3) _____

Class Notes (10) _____

Text Questions (15) _____

Article Critiques (2) _____

Teaching Assignment Handouts (5) _____

Current Periodicals (10) _____

Neat and Orderly (5) _____

TOTAL _____

3. You will be expected to read the assigned sections from the text and to participate in class discussions on the topics. You will also be expected to have answered the assigned questions for each section. These questions will be turned in at the beginning of the class period following the completion of the section.

**MAT 457 TEXT ASSIGNMENTS
FALL 2003**

SECTION	PAGE NUMBER	QUESTION NUMBERS
1.1	8	1, 2, 4, 5
1.2	15	1, 2, 3, 4
1.3	30	1, 2, 3
2.1	47	1, 2, 3, 4, 5
2.2	49	1, 2, 3, 4
2.3	54	1, 2, 3, 5
2.4	60	1, 2, 3
2.5	63	1, 2, 3, 4
2.6	70	1, 2
3.1	90	1, 2
3.2	101	1, 2, 3

3.3	115	1, 2, 3, 4
	115	ASSIGNMENT #1
4.1	134	1, 2
4.2	144	1, 3
4.3	145	1
4.4	155	1
5.1	178	1, 2
5.2	184	1, 2, 3
5.4	192	1, 2
6.1	211	1, 2
6.2	219	1, 2, 4
6.3	225	1, 2
	239	1, 2, 3
7.1	259	1, 2
7.2	261	1, 2
7.3	268	1, 2
7.4	282	1
7.5	290	1, 2
7.6	300	1, 2, 3
	305	1, 2, 3
8.1	323	1
8.2	330	1
8.3	330	1
8.4	333	1
8.5	344	1, 2
9.1	368	1, 2
9.2	376	1, 2, 3

9.3	378	1
9.4	386	1, 2, 3
	386	ASSIGNMENT # 2
10.1	402	1
10.2	412	1
10.3	421	1, 2, 3
10.4	423	1, 2
	431	ASSIGNMENTS # 3, 4
11	468	ASSIGNMENTS # 1, 2
12.1	483	1, 2, 3
12.2	489	2

4. You will read the text Middle School Mathematics – A Survival Guide to Improved Instruction and be prepared to discuss the assigned sections in class. I think you will find this material beneficial even if you are teaching Algebra I in high school. (INTASC: 2, 3, 4, 5)
5. You will need to keep a daily reflective journal for this course in your notebook. The reflections should include your thoughts on the activities and discussions from each day along with any questions and/or “surprises” you may have discovered. Reflections will be e-mailed to the instructor on Friday of each week. This will be an avenue for you and me to communicate privately. (NCTM: Communication Standard, INTASC: 6)
6. Each student will write a summary on one article from each (2 total) of the following NCTM mathematical journals: *Teaching Mathematics in the Middle School* and the *Mathematics Teacher*. Your article should be about a specific activity that can be implemented in a classroom setting. In your summary, describe the main ideas in each article, give your opinion of these ideas, and tell how you might use these ideas in your mathematics teaching. You must also locate and include the corresponding grade level, standard, focus area, and objectives from the NCTM Principles and Standards for School Mathematics and the Mississippi Mathematics Framework that best represent the activity in your article. After these critiques are returned to you they should be placed in your notebook. These critiques will be due September 30. (INTASC: 6,9)

INSTRUCTIONS FOR CRITIQUE

MAT 457

You are required to critique two articles, one from the journal *Teaching Mathematics in the Middle School* and second from *The Mathematics Teacher*. This is a formal writing assignment so correct

grammar, spelling, and punctuation will be included in the grading criteria. This two-page critique should be typed (12-point font) and double-spaced. Attach a Xeroxed copy of the article. Each critique is worth 20 points.

Each critique should:

- a) summarize the article – Be thorough and accurate. Include what went on in the author’s experience. Give at least one specific example of an activity or a strategy.
- b) discuss how the article relates to the NCTM Standards – Identify the grade band (6-

8,9-12), the Curriculum Standard, and list the focus areas of the standard that best implements/describes/fits. Briefly discuss how this article implements/describes/fits the identified standard. The NCTM document can be viewed at the following website addresses:

<http://standards-e.nctm.org>

www.nctm.org/standards2000

- c) discuss how the article relates to the Mississippi Mathematics Framework 2000 – Identify the content strand and/or the process strand, the grade level, and at least one competency best implemented/described/fitted by the article. Briefly discuss how the article implements/describes/fits the identified content and/or process strand.
- d) evaluate the article – Include your personal viewpoint on the value of this article as it relates to your classroom, teaching strategies, etc. Read the questions listed below before you read the article. Perhaps thinking through these questions will help you with the analysis/evaluation of the article. (These questions are provided as an aid, not as a framework.)
 1. What is your reaction to the article? Based on what you of classroom procedures and learning theories, do the suggestions seem feasible?
 2. Based on your current knowledge of teaching mathematics, were sound practices used in presenting the mathematical concepts?
 3. Were the activities presented in a clear, concise, simple way so that students could participate without becoming confused?
 4. Would it be possible for the students to acquire misconceptions from the activity(s)?
 5. Did the author indicate that he/she has tried his/her idea(s) in a classroom?
 6. At what grade level(s) do you feel the ideas, concepts, suggestions included in the article would be appropriate?
 7. Include any pertinent comments not addressed in questions 1-6.

RUBRIC FOR MAT 457 CRITIQUES

Article **must** address alternative teaching strategies, the use of technology in the classroom, or alternative forms of assessment. Each critique is worth 20 points.

Article

1 pt Copy of the article attached.

Grammar/spelling/format

2 pts 0 – 1 errors

1 pt 2 – 5 errors

0 pts more than 5 errors

Summary

- 1 pt Specific example of activity/strategy
- 1 pt Accuracy of summary
- 1 pt Thoroughness of summary

Evaluation

- 3 pts At least 3 of the following are addressed with supporting rationale:
 - Practices/strategies/activities
 - are/are not sound
 - are/are not feasible
 - are/are not presented in a clear way
 - are/are not appropriate for the indicated grade level
 - may/may not cause possible misconceptions
- 1 pt Personal reaction to the value of this practice in your classroom.
- 1 pt Personal reaction to the value of the teaching strategies in this article.

NCTM Standards

- 1 pt Grade Band identified
- 1 pt Curriculum Standard(s) identified
- 1 pt Focus Area(s) identified
- 2 pts Discussion on how/why the article addresses the above information .

MS Framework

- 1 pt Content Strand/Process Strand identified
- 1 pt Grade Level/Course identified
- 1 pt Competency identified
- 2 pts Discussion on how/why the article implements the above information.

Total Points _____

7. You should look in current periodicals (newspapers and magazines) to find interesting and relevant articles relating to education and/or teaching (even better if you can find some related to teaching mathematics). You should have a minimum of one (1) per week. Document the source and date for each article. We will plan to have time each week to discuss these articles. These articles should be placed in your notebook. (INTASC 9)
8. Each student is to design a bulletin board to display in SH 202. The board should be up by class on Tuesday and remain up for one week. Choose a topic from middle school or junior high mathematics (i.e., 7th and 8th grade) for the content of your bulletin board. You

will be provided a rubric by which your bulletin board will be graded. (INTASC: 1, 2, 3, 4, 5, 6, 7)

MAT 457 BULLETIN BOARD RUBRIC NAME _____

Neatness / Readability (3) _____

Correctness – Grammar (2) _____

Spelling (2) _____

Mathematical (2) _____

Clearly indicates an overall mathematical theme (5) _____

Creativity (3) _____

Engages Students (4) _____

Appropriateness (4) _____

Total (25) _____

9. Practicing in Teaching Mathematics in Grades 7 – 12.

Teaching Units: Each student will teach four lessons, one from the category of Middle School Mathematics, two from Algebra, and one from Geometry. Topics will be selected from actual high school or middle school textbooks. You will check out the teacher edition of the textbooks and prepare lessons from these books only. You may enrich your presentations with additional materials and ideas. You should use the chalkboard and overhead projector in your lessons. In your lessons you must use cooperative learning and technology and/or appropriate manipulatives. You should develop notes for each teaching effort and strive toward improving your technique and effectiveness. The teaching sessions should last twenty to thirty minutes each. In the typical mathematics class, much time is involved in taking roll, review, making assignments, class work, quizzes, etc. Your teaching lessons are to cover the section and create a presentation of the NEW material. (INTASC: 1, 2, 3, 4, 5, 6, 7, 8)

FOR EACH LESSON THAT YOU TEACH, FOLLOW THIS PROCEDURE:

1. Come to my office, go to the library, or use the internet to locate a copy of the NCTM Principles and Standards for School Mathematics.
2. Select a standard under the appropriate grade level and topic content that you are implementing in the process of your lesson.

3. Write a paragraph briefly discussing the relevant topics students would have covered prior to this lesson. Include how and where this lesson would fit into a larger unit (chapter and/or course).
4. Before the teaching of this lesson, explain to the class the INTENT and FOCUS of the specific standard.
5. One class period prior to the beginning of your lesson, turn in a COPY of the pages from the actual text you are using.
6. Following you teaching your lesson, turn in your lesson plans written in one of the provided formats. Also, include any written notes that assisted you in teaching and implementing the standards.

Your instructor and peers will complete rating sheets with constructive comments about your efforts. A compiled sheet will be given to you on the next class meeting with your evaluation and grade. Your notes will be returned to you at this time for you to keep.

10. Two test will be given during the course of the semester on the content covered up to the test date. Tues. Sept.23rd and Thurs. Nov. 6th are tentative test dates.
11. Final Exam: At the scheduled exam time you will be given a comprehensive final exam. Content of the exam will include teaching pedagogy, mathematics topics “taught” during the semester by the instructor and classmates, and an understanding of the mathematics standards. Exam time will be announced later.

MAT 457 EVALUATION:

The number of points accumulated during the course of determines a final grade. The number of points assigned to each assignment and class activities are shown below.

AUTOBIOGRAPHY	0	In this course, only four grades will be given: A: 711 + B: 632 - 710 C: 553 – 631 F: 552 and below
TEACHING ACTIVITIES		
7 th /8 th grade	50	
1 st Algebra	50	
2 nd Algebra	50	
Geometry	50	
CRITQUES (2@20 each)	40	
BULLETIN BOARD	25	
NOTEBOOK	25	
JOURNALS	50	
ATTENDANCE	50	
2 TEST @ 100	200	
FINAL EXAM	<u>200</u>	
TOTAL	790	

MAT 457L Course Policies:

1. Each student is responsible for attending the ten lab classes as they are scheduled and being able to use the manipulatives demonstrated appropriately. If a lab class is missed, it is the

student's responsibility to find out what was missed and make sure he/she understands the activities. If more than one lab/class is missed, then the lab class grade will drop one letter grade.

2. Each student is expected to be prepared appropriately for class and to participate in the teaching activities of all students.
3. Assignments are expected to be turned in on time. Late assignments will be penalized 10% of the value of the assignment.
4. A student will not be allowed to drop this class after Monday, September 29, the **LAST DAY TO DROP A CLASS WITHOUT ACADEMIC PENALTY** unless the student is withdrawing from the University (all classes).

MAT 457L Assignments:

1. Students will learn to use the demonstrated manipulatives appropriately.
2. Students will observe and assist their assigned teacher in a school setting for a minimum of 15 hours (minimum of 10 visits). During this time, the student will team teach with their teacher for one class period, mock teach their teacher (teach a lesson prepared by the teacher after watching the teacher teach the lesson to a class), and prepare and teach a lesson by themselves. The classroom teacher must approve the lesson plans for the autonomous lesson. The autonomous lesson must be video taped and turned in to the instructor by the last day of class. (NCTM: 16.1, 16.3, INTASC: 1, 2, 3, 4, 5, 6, 7, 8, 10) See attached forms to be used for your practicum experience.
3. Students will explore websites that relate to the teaching/learning of mathematics. A list of websites is provided with specific activities to be completed for each site. These sites will be useful resources to add to your "tool box". (NCTM Technology standard, INTASC: 3, 4, 6)

Scoring rubric:

Activity	Acceptable	Unacceptable
Website exploration		

4. Materials and activities implemented in the lab portion of the class are fair game for the test in MAT 457.

Disabilities Statement:

If you think you have a disability that qualifies under the Americans with Disabilities Act and requires accommodations, you should contact the Office of Support Services for Students with Disabilities (OSS) for information on appropriate policies and procedures at Southern Station Box 8586, Tel: 266-5024; TTY: 266-6837; Fax: 266-6035.

Plagiarism/Cheating Statement:

Students are expected to adhere to the highest standards of academic honesty as outlined in the USM Student Handbook. Any information that is copied from another source must be noted as such in student materials. Page number or internet reference must appear in the text and full

bibliographic reference must appear in the reference section of the paper/assignment. Other forms of academic dishonesty include, but are not limited to buying papers, copying paragraphs/pages of text/whole papers off the Internet, copying another student's answers, etc. Academic dishonesty will result in the grade of "0" on the assignment and/or in the course and/or the student may be reported the Vice President for Academic Affairs for further action.

**SECONDARY MATHEMATICS METHODS PRACTICUM:
A PRE-STUDENT TEACHING FIELD EXPERIENCE IN MAT 457**

For questions or comments, please contact:

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Contents:

Practicum Packet Provided to Students and Mentor Teachers

- A. Practicum Instructions and Assignments
- B. Graphic Representation of Practicum Progression
- C. Explanation of Parameters of Student Involvement
- D. Forms
 - 1. Practicum Log
 - 2. Observation Report Forms
 - 3. Weekly Practicum Contract
 - 4. Outline of Planned Participation
 - 5. Class Description
 - 6. Lesson Plan
- E. Practicum Student Evaluation Form

The students' grades for the practicum experience will be obtained as follows:

Reflective Journal	50 pts. (INTASC: 9, NCTM Communication)
Practicum Log	15 pts.
Observation Forms	10 pts. (INTASC:9, NCTM Communication)
Classroom Description	10 pts.
Outline of Planned Participation	10 pts.
Lesson Plans	25 pts. (INTASC: 1, 7)
Class Description	10 pts.
Explanation of Classroom Procedures	20 pts.
Total	150 pts.

Grades will be assigned as follows:

135+	A
120+	B

105+	C
Below 105	F