



SOUTHERN CONNECTICUT STATE UNIVERSITY
MAT 106 – Mathematics for Elementary Education II
9:10 – 11:00 M, 9:10 – 10:00 WF

Name: Dr. Richard DeCesare
Office: EN 130
Phone: (203) 392-5596
E-mail: decesare@southernct.edu

Office Hours: M 11:10 – 12:00, 2:00 – 3:15
W 10:10 – 12:00, 2:00 – 3:15
F 10:10 – 11:00
And by appointment

Course number: MAT 106 Credit Hours: 3 Prerequisite(s): MAT 105

Course Title: Mathematics for Elementary Education II

COURSE DESCRIPTION:

Geometry, measurement, rational numbers, irrational numbers, ratio, proportion, percent, problem solving, mathematical reasoning, and connections, probability and statistics. Required of all students in an elementary school certification program.

COURSE CONTRIBUTION:

MAT 106 is the second semester in the MAT 105-106 sequence for elementary education majors. It is mainly a content course, but methodology is discussed as well. The topics are those typically covered in the upper elementary grades, as well as middle school. This course had a laboratory component built into it, thus students meet for four (4) hours per week. The laboratory is used primarily for hands-on activities.

The mathematics content is divided into three main areas: 1) extension of number systems, 2) probability and statistics, and 3) geometry and measurement.

Having studied the whole numbers, natural numbers, and integers in MAT 105, students examine the rationals, irrationals, and reals in MAT 106. Students investigate multiple representations of these numbers, including decimals (terminating, repeating, non-terminating/non-repeating, fractions, and percents), as well as models for the four arithmetic operations on these numbers. Estimation skills are stressed throughout. Students use manipulatives such as base-ten blocks and cuisenaire rods to explore algorithms on rational numbers.

Students investigate concepts of probability, expected value, and odds, through the use of simulations using dice and spinners. For most students, these concepts are new. Students explore statistical concepts through data collection, representing data in multiple forms, and drawing conclusions from their data.

Students explore properties of shapes, including perimeter and area, through the use of geoboards and dot paper. Students learn to use various scales of measurement, including the metric system.

Finally, students present an historical topic relevant to the course, and direct an in-class activity for their classmates.

LEARNER OUTCOMES & ASSESSMENTS:

1. Students will develop and extend their understanding of fractions, decimals, ratio and proportion, and percents. (NCATE 1.51, 1.52, INTASC 1, CCCT 1.3)
2. Students will recognize and generate equivalent forms of commonly used fractions, decimals, and percents, and be able to compare and order these numbers. (NCATE 1.5.1, 1.5.2, INTASC 1, CCCT 1.3)
3. Students will understand, and be able to model, arithmetic operations on fractions and decimals, and will be able to estimate the results of arithmetic operations on fractions and decimals. (NCATE 1.5.3, 1.5.4, 1.5.5, 1.5.6, INTASC 1, CCCT 1.3)

OUTCOMES 1-3 WILL BE ASSESSED THROUGH AN EXAM, A QUIZ, HOMEWORK, IN-CLASS ACTIVITIES, AND THE FINAL EXAMINATION.

4. Students will understand and apply the basic concepts of probability, odds, and mathematical expectation. (NCATE 1.5.10, INTASC 1, CCCT 1.3)
5. Students will be able to collect data, represent the data in various forms, and draw conclusions from the data. (NCATE 1.5.9, INTASC 1, CCCT 1.3)
6. Students will be able to compute measures of central tendency (mean, median, mode) and understand what each measure indicates for a given set of data. Students will be able to compute measures of variation (range, variance, standard deviation) and understand what each measure indicates for a given set of data. (NCATE 1.5.9, INTASC 1, CCCT 1.3)

OUTCOMES 4-6 WILL BE ASSESSED THROUGH AN EXAM, HOMEWORK, IN-CLASS ACTIVITIES, AND THE FINAL EXAMINATION.

7. Students will be able to classify shapes according to their properties. (NCATE 1.5.11, INTASC 1, CCCT 1.3)
8. Students will be able to compute perimeter and area of basic geometric shapes, measure angles, and understand the relationships among these measures for similar shapes. (NCATE 1.5.7, 1.5.8, 1.5.11, INTASC 1, CCCT 1.3)
9. Students will understand the metric system and be able to perform computations in the system. (NCATE 1.5.7, INTASC 1, CCCT 1.3)

OUTCOMES 7-9 WILL BE ASSESSED THROUGH AN EXAM, HOMEWORK, IN-CLASS ACTIVITIES, AND THE FINAL EXAMINATION.

10. Students will present a mathematics topic of historical significance to their classmates, along with an activity which incorporates that topic into the elementary or middle school classroom. In addition, students will submit a written report on their topic. (NCATE 1.5.11, 1.6, INTASC 1, 3, 4, 6, 7, CCCT 1.3, 1.5, 1.6, 2.1, 2.2, 2.5, 2.6)

OUTCOME 10 WILL BE ASSESSED THROUGH AN ORAL PRESENTATION, A WRITTEN REPORT, AND THE FINAL EXAMINATION.

MODES OF LEARNING:

1. **Lecture**
2. **Individual**
3. **Group work**
4. **Hands-on activities**
5. **Student presentations (oral and written)**

COURSE OUTLINE: (group projects will be scheduled throughout the semester)

- 1. Rational numbers (two and one-half weeks)**
- 2. Ratio and Proportion (one week)**
EXAM 1
- 3. Decimals (two weeks)**
- 4. Percents (one week)**
QUIZ 1
- 5. Probability (two and one-half weeks)**
- 6. Statistics (two weeks)**
EXAM 2
- 7. Geometry (two and one-half weeks)**
EXAM 3
- 8. Measurement (one week)**
FINAL EXAM - Wednesday, May 15, 8:00 - 10:00 a.m.

REQUIRED TEXT(S)

A Problem Solving Approach to Mathematics for Elementary School Teachers, Seventh Edition, and Activities Manual, by Billstein, Libeskind, and Lott

COURSE REQUIREMENTS:

Exam 1 (measuring outcomes 1-3)

Quiz (measuring outcomes 1-3)

Exam 2 (measuring outcomes 4-6)

Exam 3 (measuring outcomes 7-9)

Group project (measuring outcome 10)

- Oral presentation
- Written report

We will create five groups of students. Each group will be responsible for presenting a topic to be named at a later date. Each member of the group will be responsible for presenting at least one aspect of the topic. Each group must also submit a written report of the topic. Groups will be given time during class to discuss and plan their presentations. If you need certain materials for your presentation, I will provide them (overhead projector, transparencies, for instance). You may also consult with me if you are having difficulty with any aspects of your topic. Additional information on these projects can be found attached to the end of this syllabus.

Comprehensive Final Exam (measuring outcomes 1-10)

Homework and in-class activities (measuring outcomes 1-9)

EVALUATION CRITERIA

Grades are based on a combination of tests, a quiz, homework, activities, a group project, and a comprehensive final examination, arranged as follows:

Chapter 5	Exam (100 points)
Chapter 6	Quiz (50 points)
Chapter 7, 8	Exam (100 points)
Chapters 9, 11	Exam (100 points)

Homework/Activities (100 points)
Group project (100 points)
Comprehensive Final Exam (150 points)

Grades are assigned as follows:

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

“+” and “-” may also be used in borderline situations.

Homework policy

Homework will be assigned on a daily basis. Approximately once a week, certain homework problems will be collected and graded. There are no makeups for missed homework assignments. I will also occasionally assign optional extra credit problems throughout the course. These problems will have due dates, and there are no makeups for these problems. You are encouraged to work with others in the class on *all* homework (collected and uncollected) and/or extra credit assignments.

Use of Calculators

You are required to have a calculator with at least a square root button and exponential button. Calculators may be used on all homework problems. I will indicate on which quizzes and tests you may use your calculator.

Attendance

Regular attendance is expected and will be taken for each class. You are allowed three unexcused absences for the semester. After that, you must supply an excuse for each additional absence. Failure to provide an excuse will result in 5 points being deducted, for each absence, from your overall point total.

Late withdrawals and Incompletes

Late withdrawals (past the March 22 deadline) are granted only in extreme circumstances. If you request a late withdrawal, you must give me a typed statement explaining the reason for your request, and it must be signed by both you and your advisor. Late withdrawals are not automatic. If you stop coming to class and do not supply me with a reason, you will receive an F in the course.

Incompletes may be given in extreme circumstances, provided I believe you will be able to complete the course work early in the next semester. Incompletes are not automatic. If you stop coming to class and do not supply me with a reason, you will receive an F in the course.

STANDARDS GUIDELINES

<p align="center">INTASC STANDARDS [Interstate New Teachers' Assessment & Support Consortium]</p>	<p align="center">PROFESSIONAL STANDARDS</p>	<p align="center">CCCT [Connecticut Common Core of Teaching]</p>
<p>S</p> <ol style="list-style-type: none"> 1. Knowledge of subject matter 2. Knowledge of human development & learning 3. Instruction adapted to meet diverse learners 4. Use of multiple instructional strategies & resources <p>A</p> <ol style="list-style-type: none"> 5. Effective learning environment created 6. Effective communication 7. Lesson planning <p>I</p> <ol style="list-style-type: none"> 9. Reflection and professional development <p>L</p> <ol style="list-style-type: none"> 8. Assessment of student learning to improve teaching <p>S</p> <ol style="list-style-type: none"> 10. Partnership with school and community 	<p align="center">NCATE - NCTM STANDARDS [National Council of Teachers of Mathematics]</p> <p align="center">OUTCOMES FOR GRADES K-4 TEACHERS WITH MATHEMATICS EMPHASIS</p> <p>1.5 Programs prepare prospective teachers who can –</p> <ol style="list-style-type: none"> 1.5.1 demonstrate knowledge of the development, use, and multiple representation of numbers and number systems 1.5.2 demonstrate number sense and knowledge of number systems 1.5.3 model the use of the four basic operations in multiple contexts 1.5.4 use a variety of mental computation techniques 1.5.5 apply estimate strategies to quantities, measurements, and computation to determine the reasonableness of results 1.5.6 model, explain, and develop a variety of computational algorithms 1.5.7 apply the process of measurement to two- and three-dimensional objects using nonstandard, customary, and metric units 1.5.8 use geometric concepts and relationships to describe and model mathematical ideas and real-world constructs 1.5.9 collect, organize, represent, analyze, and interpret data 1.5.10 apply concepts of probability to real-world situations 1.5.11 describe and represent mathematical relationships <p>1.6 Programs prepare prospective teachers who have a knowledge of historical development in mathematics that includes the contributions of underrepresented groups and diverse cultures</p>	<p align="center">DEMONSTRATIONS OF KNOWLEDGE</p> <ol style="list-style-type: none"> 1.1 understanding of student learning & development 1.2 understanding of need for different learning approaches 1.3 proficiency in reading, writing and mathematics 1.4 understanding of central concepts & skills, tools of inquiry and structures of discipline(s) 1.5 knowledge of how to design and deliver instruction 1.6 recognition of need to vary instructional methods <p align="center">APPLICATION OF KNOWLEDGE THROUGH</p> <ol style="list-style-type: none"> 2.1 instructional planning based upon knowledge of subject, students, curriculum & community 2.2 selection and/or creation of learning tasks that make subject meaningful for students 2.3 establishment and maintenance of appropriate behavior standards and creation of positive learning environment 2.4 creation of instructional opportunities supporting students' academic, social and personal development 2.5 use of verbal, nonverbal and media communication fostering individual and collaborative inquiry 2.6 employment of various instructional strategies in support of critical thinking, problem solving and skills demonstration 2.7 use of various assessment techniques to evaluate student learning & modify instruction <p align="center">DEMONSTRATION OF PROFESSIONAL RESPONSIBILITY THROUGH:</p> <ol style="list-style-type: none"> 3.1 professional conduct in accordance with the Code of Professional Responsibilities for Teachers 3.2 shared responsibility for student achievement and well-being 3.3 continuous self-evaluation regarding choices & actions on students and school community 3.4 commitment to professional growth 3.5 leadership in the school community 3.6 demonstrations of a commitment to students and a passion for improving the profession

STRATEGIES FOR SUCCESS:

Attend class regularly. You should bring your textbooks to every class, have your pencils already sharpened, and keep a clean notebook. Have your notebook open and be ready to ask questions when class starts. Do as much of the homework as you can. If you have difficulty with the material, ask questions in class or come see me during office hours. Take advantage of the free tutoring services offered here (times will be announced as soon as I receive them). Study with others in the class. Expect to spend a considerable amount of time outside of class studying and doing homework (the usual ratio is two hours of outside work for each hour of class time). Budget your time. If you work part-time or full-time, you must find a way to schedule time to do your course work. Read the text, although you might prefer to read the material after we have covered it in class.

STUDENTS WITH DISABILITIES:

As a student with a disability, before you receive course accommodations in this class, you will need to make an appointment with the Disability Resource Office located in EN 15. However, if you have other information you would like to speak with me about, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible.

BIBLIOGRAPHY

1. Bassarear, T. 2001. *Mathematics for Elementary School Teachers, Second Edition*. Boston: Houghton Mifflin.
2. Musser, G., W. Burger, and B. Peterson. 2001. *Mathematics for Elementary Teachers, Fifth Edition*. New York: John Wiley & Sons.
3. National Council of Teachers of Mathematics. 2000. *Principles and Standards for School Mathematics*. Reston, VA: NCTM.