

Teaching Elementary School Mathematics Loyola University Chicago



Fall 2008 CIEP 104 Syllabus

Dr. R. James Breunlin, NBCT

Daytime phone: 773-508-8329

Cell phone: 630-269-4331

E-mail: rbreunl@luc.edu

Office hours: Damen 115 Thursdays 1:00 to 3:30 or by appointment

Required Instructional Material

- *Mathematics: A Human Endeavor: A Book for Those Who Think they Don't Like the Subject*, by H.R. Jacobs, 3rd edition.
- *Mathematicians are People, Too: Volume 2* by Luetta Reimer, Wilbert Reimer
- *It's In The Card: Math Card Games*, by Diane Schiller
- *Riddle Math: Using Student Written Riddles to Build Mathematical Power* Carl Sherrill, morningriverpubs.com

Other Materials:

- <http://everydaymath.uchicago.edu/educator/index.shtml>
- <http://countdown.luc.edu/index.html>

Conceptual Framework

The School of Education at Loyola University Chicago supports the Jesuit ideal of knowledge in the service of humanity and the advancement of social justice. In fact the conceptual framework of the School of Education is "Professionalism in Service of Social Justice." CIEP 104 emphasizes the importance of ethical teacher behavior, equitable student access to a quality education, and strong support for the success of all. It is through a unique bond between instructor and learner that enables schools to leave no child behind and realize social justice.

Civic Engagement Competencies

A significant element of Loyola's Jesuit Catholic heritage is a focus on developing within each student the capacity for leadership expressed in service to others. Candidates in teacher preparation are engaged in tutoring activities in the first year of their study. In CIEP 104/Math 147, candidates develop a capacity to teach new material to students. They study models of excellent teachers as they prepare to give their unique imprint to mathematics instruction based on the standards developed by national and state mathematics leaders. The curriculum provides candidates with the knowledge, skill, and abilities that will prepare them to become ethical and innovative teachers; to assume leadership roles in education; and to make a positive difference in the lives of underserved children through civic engagement.

By way of example, Loyola graduates should be able to:

*** Identify models of leadership and civic engagement, both current and historical.**

The basis of the lessons taught by candidates is the standard for mathematics instructions developed by the National Council of Teachers of Mathematics (NCTM). Candidates are urged to become members of this organization. 1% extra credit is awarded to students who become members.

*** Demonstrate an understanding of the ethical responsibilities of leadership and its relationship to the Jesuit tradition**

Through the COUNTDOWN web site, candidates have access to several different models of good teaching. From the beginning, candidates learn their students expect them to come to work with them. The combination of consistency and high quality helps candidates develop professionally. Candidates know that they are preparing students to do well on high-stakes tests

*** Apply analytical and reflective tools to assess situations and recognize leadership possibilities and opportunities for civic engagement**

Candidates are trained to use the state rubric for scoring student work. Each week candidates reflect upon their students' achievement and their own performance

*** Demonstrate effective team-building skills.**

Candidates work with the same students during the semester. They build a learning community with their small group of students. As future elementary teachers, they come to understand that they are teachers of the whole child. In addition to math, they have a responsibility to motivate their students.

*** Engage in the community through activities effecting positive change in society and the environment.**

Algebra is the gateway to college. Many students get a poor start in mathematics and never recover. This class gives Loyola undergraduates an opportunity to reverse this trend. Further, candidates learn that students in the Chicago Public Schools have the shortest school day in the nation. The quest for equality of educational opportunity begins just blocks away at the local public school.

Diversity

Loyola University Chicago strives to partner with schools and community agencies in the Chicago area. This provides students with the opportunity to embrace the challenges and benefits of diversity that enhance the environment for learning. In CIEP 104, students will study and discuss important social structures that may affect students' prior knowledge and attitudes.

Technology

This course will integrate technology into mathematics instruction facilitate inductive inquiry and provide multiple representations. Teacher candidates will view videotapes of student responses to high quality instruction. Specific technology utilized includes: graphing calculator, and computer productivity tools such as spreadsheets. Candidates are expected to be expert in the use of internet to find and use excellent mathematical sites such as <http://www.forum.swathmore.edu> to research historical information about mathematical topics; <http://www.history.mcs.st> and <http://www.ac.uk/~history/>; and to make connections with mathematics and other topics such as art at <http://library.thinkquest.org/16661/>; tessellations of M Escher

Course Objectives

NCATE / NCTM Program Standards

Standard 1: Knowledge of Mathematical Problem Solving

Candidates know, understand and apply the process of mathematical Problem solving.

Standard 2: Knowledge of Reasoning and Proof

Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry.

Standard 3: Knowledge of Mathematical Communication

Candidates communicate their mathematical thinking orally and in writing to peers, faculty, and others.

Standard 4: Knowledge of Mathematical Connections

Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematical understandings.

Standard 5: Knowledge of Mathematical Representaion

Candidates can vary representations of mathematical ideas to support and deepen students' mathematical understanding

Standard 6: Knowledge of Technology

Candidates embrace technology as an essential too for teaching and learning mathematics.

Standard 7: Disposition

Candidates support a positive disposition toward mathematical processes and mathematical learning.

Standard 8: Knowledge of Mathematica Pedagogy

Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning.

Standard 9: Knowledge of Numbers and Operations

Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing numbers, relationships among numbers and number systems, and the meaning of operations.

Standard 11: Knowledge of Geometries

Candidates use special visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties.

Standard 12: Knowledge of Data analysis, statistics, and Probability

Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability.

Standard 13: Knowledge of Measurement

Candidates apply and use measurement concepts and skills

Learning Activities

The learning activities in this class insure that candidates know the content of mathematics and the standards from which math curriculum is developed. Math content is delivered through lecture, textbook problems, and class activities. In a typical lecture/problem sequence, candidates would review their understanding of factorials; explore the development of elementary instruction through manipulative and visuals; solve problems; and explore the place of factorials in the elementary mathematics curriculum. Candidates would be able to identify that factorial activities are associated with the “number and operations” standard.

Candidates tutor once a week for 1 hour for 12 weeks. Typical lessons include problem solving, computation games, computer activities, and homework review. Lesson plans are submitted the **Wednesday** prior to tutoring. Candidates are informed Thursday if there is a problem with the lesson. Students with unacceptable lessons are required to contact the professor by phone or appointment to revise the lesson. **NO CANDIDATE IS ALLOWED TO TUTOR WITHOUT AN APPROVED LESSON PLAN**

Candidates learn teaching skills. Some instruction for tutoring is delivered on line. Candidates learn how to teach a problem by watching a QuickTime movie of an experienced teacher on the COUNTDOWN website. Candidates then create a dialogue and a model answer in preparation for each tutoring experience. Candidates create computer experiences for their students in the same way.

Following the tutoring experience, candidates provide a document that assesses their achievement with the student. The second part of the document asks candidates to consider changes they would make in their delivery if they were to repeat the activity.

Candidates learn how to evaluate student work by using the same rubric used by the state to score student work on the state test, ISAT

Tentative Schedule of Discussion Topics

Class	Topics
Week 1	Introduction Teaching Standards Based Mathematics <ul style="list-style-type: none"> • National Council of Teachers of Math. • Illinois State Board of Education • Local standards such as Chicago Public Schools Technology Integration <ul style="list-style-type: none"> • COUNTDOWN web site Teaching Developmentally
Week 2	Geometry <ul style="list-style-type: none"> • Attributes • Polygons • Similarity • Congruency
Week 3	Quiz #1 Geometry <ul style="list-style-type: none"> • Polyhedra
Week 4	Measurement <ul style="list-style-type: none"> • Time

	<ul style="list-style-type: none"> • Perimeter • Area • Volume • Metric
Week 5	Quiz #2 Measurement <ul style="list-style-type: none"> • Angles
Week 6	Topology
Week 7	Quiz #3 Coordinate Geometry <ul style="list-style-type: none"> • Transformations • Equations • Inequalities Quiz #2
Week 8	Methods of Counting <ul style="list-style-type: none"> • Permutations • Combinations
Week 9	Quiz #4 Probability
Week 10	Patterns
Week 11	Quiz #5 Statistics <ul style="list-style-type: none"> • Measures of Central Tendency • Measures of Variability
Week 12	Surveys <ul style="list-style-type: none"> • Sampling • Data Analysis
Week 13	Quiz #6 Problem solving with John Napier
Week 14	Problem solving with Galileo
Week 15	Problem solving with Carl Gauss

Course Policy

- 1. Academic Honesty:** Academic honesty is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. Academic dishonesty is one of several possible reasons why a student may be dismissed from the Graduate School of Education. For specific policies and procedures see: http://www.luc.edu/education/academics_policies.shtml#honesty
- 2. Accessibility:** Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: <http://www.luc.edu/sswd>
- 3. Harassment:** It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. For specific definitions of discrimination, abuse, and harassment refer p. 25-26 in the Loyola University Chicago Student Handbook, located at: <http://www.luc.edu/studentaffairs/pdfs/LoyolaStudentHandbook2006.pdf>
If you believe you are subject to such harassment, you should notify your instructor. If you believe you are subject to harassment by your instructor, contact the Associate Dean of Academic Affairs at 312-915-6464

Course Requirements

1. Attendance: Important³! Time is short and there is much to be done. Absences should be for extreme circumstances only. Students should inform the instructor of such circumstance.

3. Participation and Responsibility: Participation is more than talking in class. Participation means allowing one self to become engaged in the learning process. The following are examples of good class participation

- Contribute interesting insightful comments
- Presenting good examples of the comments on hand
- Raising good questions
- Listening and responding appropriately to others comments
- Being sensitive to your level of participation, making attempts to increase or decrease it if necessary
- Arriving on time for class

(Source: RE550 syllabus, Iowa State University)

4. Evaluation: A wide variety of evaluation strategies are used.

In addition candidates have an opportunity to earn extra credit. Each extra credit activity requires 2 – 5 hours of work. Successful completion of each activity will earn 1% added to the final grade. A ‘point’ system is used in this course thus the percents that follow are approximate

- **Assignments 22%**

All written work should be handed in on the due date. Late assignments are penalized 50% per session late

- **Tutoring 18 %**

Candidates will prepare a packet for each lesson they tutor. It will include a dialogue, sample answers, and a reflection for each of the 12 tutoring sessions. Eighteen percent of the course grade is related to tutoring: 12% for participation and 6% for the tutoring lesson plan.

- **Quizzes 30%**

6 @ 5%

- **Final Exam 30%**

The final exam consists of content and methods questions taken from a study guide and homework problems. It is cumulative. The following questions have appeared quizzes and/or final:

14. The call letters of radio and television stations in the United States begin with either K or W. Stations west of the Mississippi start with K and those east of the Mississippi start with W. How many having 3 call letters are possible? How many more are possible if 4 call letters are used?

15. A toy train has an engine, six cars, and a caboose. Suppose that the engine is always put first and the caboose always placed last. In how many different orders can the train be arranged using the engine, caboose, and all six of the cars? Is this a combination or permutation? What is the correct mathematical notation?

16. Imagine you have tossed a coin 10 times. What is the probability that I could guess the order of heads and tails from your tosses?

Grade Assignment

- A 93-100%
- B 92-85%
- C 84-78%
- D 77-70%
- F 69-0%