Teaching Elementary School Mathematics
Loyola University Chicago

Fall 2008 *CIEP 105* Syllabus

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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

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 105 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.

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 105, 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

This course will contain a core assessment of **Conceptual Framework Standard 5**: Candidates demonstrate technological knowledge and skill which enhance education

Core Assessment Rubric

Conceptual Framework Standard	Target	Acceptable	Unacceptable
CF5: Candidates demonstrate technological knowledge and skill which enhance education	Targeted Performance is evidenced by the selection of an appropriate technological tool, such as but not limited to, spreadsheets, dynamic graphing software, computer algebra systems, calculators, and presentation software, that promotes conceptual understanding of a mathematical concept or facilitates student construction of knowledge	Acceptable performance is evidenced by the use of appropriate technology, as a curriculum amplifier (use of technology to replicate an existing task. e.g. electronic flashcards). The activity provide motivation for students	Unacceptable performance is evidenced by the use of technology as a curriculum amplifier that is not motivational
Overall Score			

Course Description

This course sequence provides the fundamental knowledge base for teaching elementary and middle school mathematics. This is the second of two courses. The focus is on algebra and problem solving. Candidates study the underlying principals of mathematics appropriate for grades K – 9. Candidates use Principals and Standards for School Mathematics from the National Council of Teachers of Mathematics (http://www.nctm.org/standards/default.aspx?id=58) and compare the national standards to the Illinois State Learning Goals (http://www.isbe.state.il.us/ils/lmath.html) and local mathematics standards such as the Chicago Academic Framework from the Chicago Public Schools (http://intranet.cps.k12.il.us/standards/CAS.html)

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 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 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 10: Knowledge of Different Perspectives on Algebra
Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change.

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

Tentative Schedule of Discussion Topics

Class date	Topics or Issues
August 26	• Teaching Developmentally • NCTM Standards • Numbers, numbers, everywhere
September 2	No Class: 1st day of school at Hayt Elementary
September 9	• Number Tricks and their Algebraic Representations • Tangram patterns
September 16	• Fractions: 3 uses … ratio, part of a whole, division • Ratio, Proportion, Percent • Comparing numbers / computation
September 23	• Multiplication from Patterns to Slope • Exponents • Substitution
September 30	• Graphs and Coordinate Geometry • Midterm Exam
October 7	Midterm Break No class
October 14	• Variables and solving equations • Graphing equations • Symbolic, graphical and Numeric Representations
October 21	• Statistics • Surveys
October 28	• Teaching from Problems: Geometry (Jacobs: Chapter 5)
November 4	• Teaching from Problems: Measurement (Jacobs: Chapter 2)
November 11	• Teaching from Problems: Number and operations (Jacobs: Chapter 1, 4, 7)
November 18	• Teaching from Problems: Algebra (Jacobs: Chapter 3)
November 25	• Teaching from Problems: Statistics (Jacobs: Chapter 9)
December 2	• Teaching from Problems: Probability (Jacobs: Chapter 8)

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: Important[3]! 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.

2. Assignments: There will be homework, papers, quizzes, tests and a final exam. All written work should be handed in on the due date. Late assignments are penalized 50% per session late.

Students will produce a lesson plan that will be evaluated using the following rubric:

CIEP 105: Mathematics Lesson Plan Rubric (*Understanding by Design* format)

	Target	**Acceptable**	**Unacceptable**
Content Standards ACEI 2.3 NCTM 8.4	Targeted performance is evidenced by linking highly appropriate standards to the lesson objectives	Acceptable Performance is evidenced by identifying appropriate standards	Unacceptable performance is evidenced by not identifying standards or identifying too broad, too difficult or inappropriate for the learner
Student Objectives NCTM 8.4	Targeted performance is evidenced by three or four objectives that are clearly related to the instruction and are written in correct format	Acceptable Performance is evidenced by three or four objectives that are related to the instruction and are written in correct format	Unacceptable performance is evidenced by objectives not written in the correct format or marginally related to instruction.
Learning Activity Description ACEI 2.3,3.3 NCTM 8.1, 8.3, 8.4, 8.7	Targeted performance is evidenced by a clear description of needed materials, introduction, lesson body, guided practice, feedback, independent practice and closure	Acceptable Performance is evidenced by description of most of the following components: needed materials, introduction, lesson body, guided practice, feedback, independent practice and closure	Unacceptable performance is evidenced by unclear or not detailed description of needed materials, introduction, lesson body, guided practice, feedback, independent practice or closure.
Learning Activity Sequencing ASCI 2.3, 3.3 NCTM 3.3, 4.3	Targeted performance is evidenced by use of multiple instructional strategies. Strategies are focused, sequential, build on one another and engaging	Acceptable Performance is evidenced by an attempt to use multiple strategies but fail to build on one another or has flawed focus or sequencing	Unacceptable performance is evidenced by a failure to use multiple strategies. The instruction is vague or difficult for a student to follow
Plan for student	Targeted performance is	Acceptable Performance	Unacceptable performance

motivation/ adaptation for diverse learners ACSI 3.2 NCTM 7.1,7.2, 8.1	evidenced by a deliberate plan to motivate students and provide appropriate entry points for diverse learners	is evidenced by an implicit plan to motivate students and provide appropriate entry points for diverse learners	is evidenced by no mention of a plan to motivate students or accommodate diverse learners.
Interdisciplinary Connections NCTM 4.1	Targeted performance is evidenced by a deliberate plan to make meaningful connections to other disciplines or the real world	Acceptable Performance is evidenced by an implicit plan to make some connections to other disciplines or the real world	Unacceptable performance is evidenced by no mention of a plan to make some connections to other disciplines or the real world
Check for comprehension/ assessment ASCI 4.0 NCTM 7.5, 8.3	Targeted performance is evidenced by the clear identification of criteria to determine level of student learning. The evaluation is linked to the objectives	Acceptable Performance is evidenced by some identification of criteria to determine level of student learning. The evaluation is linked to some of the objectives	Unacceptable performance is evidenced by the lack of criteria to determine level of student learning. little effort to link evaluation to the objectives
Overall Score			

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.

- Activities/ assignments 20%
  Candidates are expected to complete a variety of activities such as lesson plans, article reviews, web research. Late assignments are awarded 50% credit

- Homework 20 %
  Candidates are expected to complete assigned homework each week and hand it in the next class. Late homework is awarded 50% credit

- Clinical Activities 15%
  Candidates will prepare a packet for each lesson they tutor. It will include a dialoge, sample answers, and reflection for each of 12 tutoring sessions. These dialogues and answers will be reviewed until they are acceptable.

- NCTM Notebook 5%

- Midterm 20 %

- Final Exam 20%

Grade Assignment

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