# MATH 6161
# Mathematical Reasoning
**Summer 2013**

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**Office Hours** : By appointment
**Options** : Call, e-mail, or make an appointment

## PRE-REQUISITE

Acceptance into the program.

## REQUIRED MATERIALS

**Textbooks**:

Long, C. T. & DeTemple, D. W. (2012). *Mathematical Reasoning for Elementary Teachers* (6th Ed.), New York, NY: Addison-Wesley. **ISBN-10:** 0321693124 **ISBN-13:** 978-0321693129 (main text)

Ashlock, R. B. (2010). *Error Patterns in Computation* (10th Ed.), Columbus, OH: Merrill Prentice-Hall. **ISBN-10:** 0135009103 **ISBN-13:** 978-0135009109 (reference text- optional)

**Note:** Summer 2012 we will be going to new editions of both of the above texts.

**Other**: Colored pencils or markers, graphing calculator

## COURSE DESCRIPTION

MATH 6161 is an in-depth study of concepts and processes underlying the P-8 mathematics curriculum, with special emphasis on informal and formal mathematical reasoning. The analysis and remediation of student errors manifested in the application of conceptual and procedural mathematical knowledge will also be addressed.

## COURSE GOALS

This course is designed to address five major goals. These are:

1) to strengthen your reasoning, critical thinking, and problem-solving skills;
2) to develop your skills in communicating mathematics in written forms and with a variety of representations;
3) to develop your skills and ability to diagnose elementary and middle grades students' misconceptions and error patterns in mathematics, and to plan and deliver instruction that remediate those misunderstandings;
4) to provide opportunities for collaborative learning in mathematics; and
5) to promote your active involvement in the learning of mathematics.

## GENERAL STUDENT LEARNING OUTCOMES

By the time you finish this course, you should know (understand) and be able to do the following:

1) understand, model, and appreciate the role of informal and formal mathematical reasoning skills and processes within the context of teaching and learning mathematics.
2) understand fundamental concepts of formal logic and the relationship to deductive reasoning.
3) a) solve a variety of routine and non-routine problems;
   b) select and apply appropriate problem-solving strategies, and describe all aspects of the problem-solving process;
   c) approach unfamiliar problems with confidence in your ability to find solutions.
4) a) model pre-number and numeration concepts, including place value;
   b) meaningfully develop and model each of the four basic operations of arithmetic and apply those to a variety of problem settings;
   c) model and explain computational algorithms in a meaningful, developmentally appropriate fashion;
   d) develop and apply a variety of mental computation and estimation techniques;
   e) extend number system knowledge from the whole number system to integers, rationals, and real numbers;
   f) model and apply fundamental number theory concepts.
5) describe and utilize appropriately the content and process standards contained within the NCTM Standards 2000 and the Georgia Performance Standards (GPS).
6) diagnose elementary or middle grades students' misunderstandings of mathematical concepts or procedures and develop and deliver appropriate instruction designed to correct those misunderstandings.

## CLASS PREPARATION:

Two essential components of this course are 1) preparation for class by completing assignments, and 2) involvement in class activities including on-line discussions. In this course it is impossible to be engaged in quality learning without taking these two components seriously. Class activities and discussion are very much a part of learning about mathematics. You are expected to be a participant in ways that are most meaningful to you.

The intention is for you to make sense of mathematics as well as to consider mathematics classrooms that will provide potentially meaningful mathematics learning opportunities for your students. This class is your opportunity to begin to make sense of these ideas - make it as rich as you possibly can! As part of an intellectual community, we should find appropriate opportunities to read, research, reflect, present, challenge, and discuss ideas.

## ASSESSMENT

Grading Scale

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

There will be examinations (worth 100 points each), assignments (point values will be assigned per assignment), and a mandatory final examination.

## Examinations and Makeup Policy

**NO MAKEUP EXAMS WILL BE GIVEN** after the test has been administered to the class. If you know in advance that you must miss an exam day, let the instructor know **in advance** so arrangements can be made to take the exam early. It is **NOT** your right to take an exam early. This is done at the discretion of the instructor.

Each of the examinations is an individual examination. The content of the examinations comes from the material presented in the course through readings (text and additional readings), text exercises, Web assignments, online-class notes, and online-class activities.

## Daily In-Class Work and Homework Assignments

The in-class experiences and out-of-class assignments are integral parts of the course. You can expect to:

1. ***Online-class activities***. Complete online-class activities with a good work ethic and a positive attitude.
2. ***Text exercises or instructor made homework***. Text exercises or instructor made problems or exercises will generally be given for homework chapter section. Complete text exercises as homework and have the exercises ready to ask questions at the next class meeting.
3. ***Web Assignments.*** All Web assignments are **due as indicated in the tentative schedule or the assignment instructions**. **NO LATE WORK** will be accepted unless **PREVIOUS** arrangements were made with the instructor.

## CLASSROOM ACCOMMODATIONS

Students requesting classroom accommodations or modifications because of a documented disability must contact the Access Office for Students with Disabilities located in room 1115 Nevins Hall. The phone numbers are 245-2498 (voice) and 219-1348 (tty).

Instructor reserves the right to make changes or modifications to the syllabus upon notification of the class members.