

# MATHEMATICS, PROBLEM SOLVING, AND TEACHING

MATH 486 | FALL 2014

## **INSTRUCTOR:**

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## **COURSE DESCRIPTION AND RATIONALE:**

Hiebert and others describe one of the essential principles for mathematics instruction as building understanding in mathematics through problems. Instruction ought to allow students to wonder why things are, to inquire, to search for solutions, and to resolve incongruities. In a problem-based approach, students are expected to solve problems or make sense of mathematical situations. Ideally students need to explore problems, make conjectures, and draw generalizations about mathematics concepts and processes. Students can also make connections between mathematical ideas that are familiar to them by solving new problems in a variety of different settings. Although no one claims the existence of one correct way to teach, using good problems to plan instruction with the focus on student thinking and reasoning is one strategy that holds promise. The new emphasis on modeling in the Common Core State Standards for Math (CCSS-Math) aligns with this movement of problem-based mathematical instruction. This course aligns with the demonstrating proficiency of the first seven of eight Middle Level Mathematics Teaching standards for the state of Washington. In this course you will demonstrate your proficiency formatively and then summatively on your Middle Level Mathematics Teaching Livetext Portfolio. This course includes a field-experience, you will be given a placement and you must document at least 30 hours of participation with K-12 students.

## **COURSE OUTCOMES:**

1. Teacher candidates will show their mathematical knowledge mastery of all six mathematical content domains of the state endorsement standards for middle level mathematics.
2. Teachers candidates will be able to use and teach the mathematical practices of the state endorsement standards for middle level mathematics.
3. Teacher candidates will design relevant and interdisciplinary learning activities that engage students in meaningful mathematics.
4. Teacher candidates will design assessment activities that align with the CCSS-Math and clearly reveal students' understanding of math concepts.
5. Teacher candidates will be able to reflect on the philosophical and pedagogical practices of teaching mathematics in our present culture.
6. Teacher candidates will participate collaboratively and professionally in teaching K-12 activities.

## **ASSESSMENT AND EVALUATION GUIDELINES:**

The assessment strategies for this course are designed to inform the teacher candidate of their progress in achieving the course outcomes (instructor reserves the right to change assessment to meet the learning goals of the courses).

<b>Assignment</b>	<b>Points</b>
Content Domain Concepts and Procedures Activities (5 in-class activities)	25
Content Domain Concepts and Procedures Worksheets (5 worksheets)	50
Content Domain Concepts and Procedure Quizzes (5 quizzes)	100
Content Modeling and Gaming Activity (5 in-class activities)	75
Group Presentation of Modeling Activity (1 presentation)	15
Group Blog Post of Modeling Activity (1 post)	20
Reflection of Teaching Experience (3 papers)	30
Posting of Teaching Evaluations and Reflections in livetext	20
Teaching Commentary on Modeling Activity (1 reflective writing commentary)	20
Livetext Portfolio	100
<b>Total Points</b>	<b>455</b>

**Grading Scale**

80-100% = A, 75-80% = A-, 70-75% = B+, 65-70% = B, 60-65% = B-, 55-60% = C+, 50-55% = C, 45-50% = C-, 40-45% = D+, 35-40% = D, 30-35% = D-, 25-30% = F Please see the CWU Catalog for the eligibility requirements for an incomplete (I).

**Performance Expectations**Schedule

If you miss a class, it is your responsibility to find out what was covered, announced, or assigned. In case of emergencies, it is your responsibility to contact the instructors as soon as possible. If a course deadline was missed, assessment alternatives are left up to the discretion of the instructors.

Suggestions for Success

Take the responsibility for your own achievement of these performance objectives. Use the activities, assignments, assessments and people such as the instructor to insure that you understand the mathematical teaching concepts and can demonstrated this understanding in the form of the performance objectives.

**COURSE RESOURCES:****Canvas**

Use Canvas (<https://canvas.cwu.edu/>) to view assignments, announcements, course resources, course notes, and course grades.

**Textbook and Course Material**

- Canvas account with enrollment in MATH 486
- Handouts provided by the instructors
- Graphing Calculator

**Additional Readings and Videos**

Readings will be taken from peer-reviewed journals and education magazines. Most readings will be available in Blackboard in .pdf format. Other readings will be available online, with a hyperlink provided in Blackboard. Online presentations will be posted on Blackboard. Most videos are in MPEG4 these can be played through itunes or most video players.

**ADA STATEMENT:**

Students with special needs or disabilities who desire academic accommodation are encouraged to submit a copy of the 'Confirmation of Eligibility for Academic Adjustments' from the Disability Support Services office as soon as possible so a plan can be developed that best serves the learning needs of the student. Students without this form should contact the Disability Support Services office in Bouillon 205 at 963-2171 or [dssrecept@cwu.edu](mailto:dssrecept@cwu.edu) as soon as possible.