George Mason University
Department of Mathematical Sciences in cooperation with
Graduate School of Education

Special topics: MATH 600 (3 credits)
Number Sense, Computational Fluency and Assessment in the Elementary Grades
Spring 2014
Professional Development Outreach Course
Center for Outreach in Mathematics Professional Learning and Educational Technology

Course Organizers and Instructors:
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I. Course Description: *Assessing through Problem-based Tasks and Unpacking the Mathematical Learning Progressions in K-6*
This course focuses on mathematical inquiry through understanding how students learning progresses in the domains of Numbers, Rational Numbers, Functions and Algebra, Data Analysis & Probability, Measurement and Geometry.

Class Meetings: The meeting dates are as follows:

- Two Saturdays: May 3, June 7 from 9-2:30pm **LOCATION: GMU Fairfax Campus** Exploratory Hall, Room L102 (Both classes are mandatory)
- Seven Thursdays: April 24, May 1, May 8, May 15, May 22, May 29, June 5 from 4:30-7:10 **LOCATION: GMU Prince William Campus,** Beacon Hall, 10900 University Blvd., Manassas, VA

II. Student Outcomes

At the conclusion of this course, students should be able to:

A. Promote a better understanding of the nature of mathematics, learning progressions and mathematical inquiry
B. Demonstrate problem-solving strategies in various mathematical content areas and methods for cultivating problems solving, reasoning and communicating skills
C. Foster an understanding of how children's mathematical thinking develops
D. Articulate methodologies for teaching mathematics more effectively to children with various abilities in Grades K-8; Plan effective mathematics instruction for students from diverse populations with a variety of learning needs

III. Nature of Course Delivery

The delivery of this course combines methods of seminar, online sessions, active learning, discussion, independent work, student presentation, mathematical problem solving, and writing. The course is designed both in structure and process to engage students in dialogue at the individual, group, and collective levels. Different formats will be used to help build both the capacity of the learning community. Readings and lectures will precede and focus class on-line discussions and interactive forums. This course relies on your willingness to participate in all class and team discussions. You will be asked to complete weekly reading assignments and offer key ideas on how the readings inform professional experience. The syllabus lays out an initial plan for our work and may be revised during the course to meet students' needs and interests. Students are expected to be independent thinkers, intellectually curious, and responsible to each other for the quality of classroom learning. This calls for both purposeful collaborative work as well as deep individual reflection. The course is designed to enhance both of these skill sets. You should expect to spend time in between classes to reading/viewing/listening to assigned materials, conducting research and completing assignments, completing reflections, problem solving and simulations, and participating in substantive on-line discussions.

IV. Readings: Reading packet & Resources on Class website

V. Course Requirements and Assignments

The assignments across the semester are intended to improve your strategies as a mathematics teacher and to develop your skills in the interpretation, critique and synthesis of mathematics education research. All assignments are to be completed on time so that class members might benefit from the expertise and contributions of their colleagues.

A. Participation, Postings and Reflections (30%)

Class Participation: Class seminars will consist of a discussion of the readings and related problems. Readings are to be completed before each class seminars. Students are expected to analyze and reflect on the readings and come to class prepared to participate in the discussion.

Posting and Reflections: Participants will write reflections in order to process mathematical ideas, mathematical learning progressions, and pedagogy that are discussed in the seminars and highlighted in the readings.

B. Collaborative Video Lesson Analysis (40%)

During the course, we will be examining a lesson with a focus on number sense and computation.

This assignment includes the following components:

1) Group Lesson Plan (10%)

As a collaborative team, you will develop a lesson plan using the "Thinking through a Lesson Protocol". This will be discussed in greater detail during the seminars.

2) Video Lesson Upload and Discussions (10%)
Each teacher will teach the lesson in their respective classrooms, capturing the three phases of the lesson-(see Van de Walle guide). They will upload on the https://www.beasmartercookie.com/ for peer coaching.

3) Final Reflection and Analysis (20%)
Individually, you will analyze the implementation of the lesson, reflect on the collaborative process, and reflect on the implications to your teaching practices. This will be discussed in greater detail during the seminar.

C. Student Work Analysis (20%)
Participants will analyze student work produced from problem-based tasks. During the collaborative lesson process, participants will monitor the learning of three pre-selected students. Participants will submit a final paper that analyzes the students' learning before, during, and after the implementation of the collaborative lesson plan.

D. Final Content Exam (10%)
Participants will take comprehensive exam covering the content studied in the course. The main focus of the exam will be on the mathematical content of the course. Students will be expected to demonstrate their own understanding and reasoning of the content as well as the knowledge and understanding needed by K-5 students in order to make sense of this content.

THE COLLABORATE LESSON ANALYSIS PROECESS

Collaborative Planning Activity
This assignment will take place during the face to face sessions. Small groups will select a lesson from the Navigations series. Groups will meet throughout the course to plan for the implementation of the lesson. Groups are required to participate in all discussions including face-to-face, synchronous online, and asynchronous online.

Lesson Implementation
Each participant will video record while he/she implements the lesson. After analyzing and reflecting on the video, participants will select a portion of the video to share with their collaborative group.

Written Reflections
Participants are required to reflect on the teaching experience. These reflections will be written and submitted to the course instructors only. (See B. above).

VI. Evaluation Schema

Determination of the Final Grade:

Graduate Grading Scale

A	93%-100%	B+	87%-89%	C	70%-79%
A-	90%-92%	B	80%-86%	F	Below 70%

VII. UNIVERSITY POLICIES

The university has a policy that requests students to turn off pagers and cell phones before class begins.

Formative Assessment:

http://www.smarterbalanced.org/sample-items-and-performance-tasks/

http://www.parcconline.org/K2-assessments

http://www.ccsstoolbox.com/parcc/PARCCPrototype_main.html

http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/maths/assessment/Pages/misunderstandings.aspx

http://map.mathshell.org/materials/index.php

http://www.exemplars.com/resources/formative/index.html

http://mathforum.org/mathed/assessment.html

http://balancedassessment.concord.org/

Explorelearning(Gizmo): www.explorelearning.com

AIMShttp://www.aimsedu.org/

Middle school Contextualized Problems: http://www.mmmproject.org/data.htm

Model Eliciting Tasks: http://crlt.indiana.edu/research/csk.html

HONOR CODE

To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of George Mason University and with the desire for greater academic and personal achievement, George Mason University has set forth a code of honor that includes policies on cheating and attempted cheating, plagiarism, lying and stealing. Detailed information on these policies is available in the GMU Student Handbook, the University Catalog, and on the GMU website (www.gmu.edu).

Individuals with Disabilities Policy

The university is committed to complying with the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 by providing reasonable accommodations for applicants for admission, students, applicants for employment, employees, and visitors who are disabled. Applicants for admission and students requiring specific accommodations for a disability should contact the Disability Resource Center at 703-993-2474, or the University Equity Office at 703-993-8730.

ATTENDANCE POLICY

Students are expected to attend the class periods of the courses for which they register. Although absence alone is not a reason for lowering a grade, students are not relieved of the obligation to fulfill course assignments, including those that can only be fulfilled in class. Students who fail to participate (because of absences) in a course in which participation is a factor in evaluation, or students who miss an exam without an excuse, may be penalized according to the weighted value of the missed work as stated in the course syllabus (GMU University Catalog, pg. 32).

TASKSTREAM REQUIREMENTS

Every student registered for any MEL course with a required performance-based assessment (will be designated as such in the syllabus) is required to submit this assessment (*Professional Development Grant Proposal*) to TaskStream (regardless of whether a course is an elective, a onetime course or part of an undergraduate minor). Evaluation of your performance-based assessment will also be provided using TaskStream. Failure to submit the assessment to TaskStream will result in a the course instructor reporting the course grade as Incomplete(IN). Unless this grade is changed upon completion of the required TaskStream submission, the IN will convert to an F nine weeks into the following semester.

GMU POLICIES AND RESOURCES FOR STUDENTS

a. Students must adhere to the guidelines of the George Mason University Honor Code [See http://oai.gmu.edu/honor-code/].
b. Students must follow the university policy for Responsible Use of Computing [See http://universitypolicy.gmu.edu/1301gen.html].
c. Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.
d. The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See http://caps.gmu.edu/].
e. Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See http://ods.gmu.edu/].
f. Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.
g. The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing [See http://writingcenter.gmu.edu/].

PROFESSIONAL DISPOSITIONS

Students are expected to exhibit professional behaviors and dispositions at all times.

CORE VALUES COMMITMENT

The College of Education & Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expectedto adhere to these principles. http://cehd.gmu.edu/values/

For additional information on the College of Education and Human Development, Graduate School of Education, please visit our website [See http://gse.gmu.edu/].