ALIGNMENT WITH NEAG SCHOOL OF EDUCATION CONCEPTUAL FRAMEWORK

The Conceptual Framework of the Neag School of Education is defined by three themes: Learning, Leading, and Lighting the Way. This course addresses the Learning theme through its expectations that the teacher candidates will acquire and demonstrate strong professional knowledge base and skills for implementing evidence based professional practice—as applied to mathematics education. While students in their senior year are not yet formally focusing on leadership (a theme of the master’s year), the theme of Leading is addressed through a commitment to inquiry and reflection in the context of mathematics teaching and learning. The third theme, Lighting the Way, involves embracing diversity and challenges in an ever-changing world. Teacher candidates are expected to differentiate learning, to inspire and motivate learners, and to work toward equity and human rights.

COURSE THEMES

Communication and problem solving to enhance students’ mathematical meaning making will be integrated throughout this course. Additionally, this course will include particular focus on teaching mathematics to linguistically diverse students.

COURSE OVERVIEW

This course will provide preservice teachers with a practical foundation for the teaching and learning of mathematics aligned with the Principles and Standards for School Mathematics developed by the National Council of Teachers of Mathematics (NCTM, 2000). The aim of this course is to develop ways of thinking about mathematical content, students, and instruction of mathematics in grades K – 6. This course will help preservice teachers understand and use the underlying principles of key mathematical concepts in a problem-solving environment. Additionally, this course will have particular emphasis on verbal and written language as tools for facilitating mathematical understanding, including strategies for supporting linguistically diverse students. Course content will include an examination of the NCTM Content Standards (i.e., number and operations, algebra, geometry, measurement, and data analysis and probability) and Process Standards (i.e., problem solving, reasoning and proof, communication, connections, and representation), the use of manipulative tools and technology in classroom practice, and sense-making in elementary school mathematics. Additionally, components of the NCTM Curriculum Focal Points (2006), the Connecticut State Curricular Mathematics Standards, and the Common Core State Mathematics Standards (2010) will be addressed. Preservice teachers will develop strategies for becoming life-long learners in order to meet the evolving instructional needs of their students.

COURSE OBJECTIVES

- Develop knowledge of major concepts, procedures, and reasoning processes of mathematics that define number systems and number sense, geometry, measurement, statistics and probability, and algebra in order to foster student understanding and use of patterns, quantities, and spatial relationships that can represent
phenomena, solve problems, and manage data (Association for Childhood Education International [ACEI] Mathematics Standard)

- Examine the National Council of Teachers of Mathematics [NCTM] Principles and Standards for School Mathematics and Curriculum Focal Points and their impact on mathematics education.
- Use national and state curricular standards and frameworks to inform mathematics instruction.
- Develop, teach, reflect upon, and adjust lesson plans appropriate for K-6 mathematics instruction.
- Develop strategies for incorporating content and language objectives into mathematics lessons.
- Develop strategies for integrating problem-solving into mathematics lessons.
- Develop strategies for assessing students’ prior learning and ongoing learning in order to inform instruction and enhance students’ learning.
- Develop an understanding of the role of various methods, materials, manipulatives, and technologies in elementary mathematics curriculum and instruction.
- Develop strategies for differentiating instruction to meet students’ individual learning needs.
- Develop strategies to support mathematics learning of linguistically and culturally diverse students.
- Reflect on mathematics teaching and learning to enhance teaching practices and students’ learning.
- Develop strategies for continuing to learn about mathematics, students, and instruction related to teaching and learning mathematics in the elementary school.
- Develop enthusiasm for teaching and learning of mathematics!

COURSE INFORMATION

Reasonable Accommodations:

The University of Connecticut is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodation are invited to make their needs and preferences known as soon as possible. Please contact the course instructor or the appropriate University office (Center for Students with Disabilities, University Program for Students with Learning Disabilities) to discuss your needs.

Some Useful Contact Information:

- Center for Students with Disabilities: http://www.csd.uconn.edu/
- University Program for Students with Learning Disabilities (UPLD) http://www.education.uconn.edu/departments/epsy/upld/
- Counseling and Mental Health Services: 486-4705 (after hours: 486-3427) www.cmhs.uconn.edu
- Career Services: 486-3013 www.career.uconn.edu
- Alcohol and Other Drug Services: 486-9431 www.aod.uconn.edu
- Dean of Students Office: 486-3426 www.dos.uconn.edu

Academic Integrity:

Please refresh yourself with the following University of Connecticut academic integrity policy:

“A fundamental tenet of all educational institutions is academic honesty: academic work depends upon respect for and acknowledgement of the research and ideas of others. Misrepresenting someone else’s work as one’s own is a serious offense in any academic setting and it will not be condoned.

Academic misconduct includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for academic evaluation (e.g. papers, projects, and examinations); any attempt to influence improperly (e.g. bribery, threats) any member of the faculty, staff, or administration of the University in any matter pertaining to academics or research; presenting, as one’s own, the ideas or words of another for academic evaluation; doing unauthorized academic work for which another person will receive credit or be evaluated; and presenting the same or substantially the same papers or projects in two or more courses without the explicit permission of the instructors involved.

A student who knowingly assists another student in committing an act of academic misconduct shall be equally accountable for the violation, and shall be subject to the sanctions and other remedies described in The Student Code.”
Observation of Religious Holidays:
After reviewing the syllabus, please contact the instructors if you foresee a conflict between the due date for a major assignment and your religious observances.

Course Materials:
Texts:


Options for *Principles and Standards for School mathematics* (PSSM) (your choice):

a) Sign up for free 120-day access to the NCTM PSSM. Go to [http://standards.nctm.org/](http://standards.nctm.org/)
   Select “120-Day Free Trial.” You will be asked to give your name, email address, and a password. A caveat is that this is a one-time only offer from NCTM, so if you have done it in the past, you may not be able to do it again (at least not using the same email address).

b) Become a student member of NCTM. $39 gives you electronic access to NCTM Standards, one journal, and certain “member only” sites: [http://www.nctm.org/membership/content.aspx?id=7618](http://www.nctm.org/membership/content.aspx?id=7618)

c) If you really want the “book”, you can purchase a paper version of the PSSM (from NCTM: $54.95 for non-members and $43.96 for members. Go to [www.nctm.org](http://www.nctm.org) then “shop online.”) Alternatively, used copies may be available via online booksellers.

Options for obtaining access to the *Focal Points*—either paper or electronic versions (your choice):
Sections of Focal Points will be shared in class; if you want the full version, it is available for a fee from NCTM. Go to [http://www.nctm.org/standards/](http://www.nctm.org/standards/)

Additional Reading: Other required readings will be distributed during class or posted on our class webpage. They will be listed in the schedule or you will be informed of them during class.

As part of your EGEN seminars you were asked to purchase a couple of books listed below. We will be referring to these books within the math methods class.


Some additional suggested resources:
Journal articles available through NCTM membership—for example, *Teaching Children Mathematics* and *Mathematics Teaching in the Middle*


**Evaluation Requirements:**
The elements that will go into determining grades for this course will be:

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<th>Class Participation (30%)</th>
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<td>• In-class activities, discussion, reflection &amp; miscellaneous assignments .......... 20%</td>
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<td>• Discussion Board Postings ................................................................. 10%</td>
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**Analysis of Student Work ................................................................. 10%**

**Course Project - Video Lesson Project (60%)**:

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<td>• Working Draft of Lesson Plan .......................................................... 10 %</td>
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<td>• Video .......................................................... ................................ 10 %</td>
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<tr>
<td>• Final (Revised) Lesson Plan ............................................................. 20 %</td>
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<tr>
<td>(If revised lesson plan grade is higher than working draft grade, revised plan grade replaces working draft grade)</td>
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<tr>
<td>• Lesson Reflection .......................................................... 20 %</td>
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**Class Participation**

Your attendance and participation in class are critical to the success of this course. It is expected that you will come to class prepared to actively interpret the readings, share your ideas, and engage in activities.

- **In class activities, discussion, reflection & miscellaneous assignments**: The nature of this course requires active participation, including: discussions, group work, and activities that will help you to make sense of the reading and out-of-class assignments. There will be occasional written reflections, etc. assigned during class.

- **Online discussion posts**: You will be asked to post responses a few times throughout the semester. You will do this via a Taskstream discussion board. Log on to your Taskstream account ➔ go to Communications ➔ then to Discussion Board ➔ then to Elementary Math Methods, Fall 2010, Group A. Respond to the posted topics by the date indicated. They will be listed in the course calendar and/or announced during class.

**Analysis of Student Work – due September 21**

Assessment is at the heart of effective learning environments. One means of assessing student understanding occurs during the review and analysis of student work. For this assignment, you will need to obtain a copy of a piece of student work from your clinic placement. It would be best if you used student work from a lesson you observed/assisted with as part of your day in your clinic placement. You will then analyze the student's work and try to draw some conclusions about the student's understanding.

In your analysis of the student work (1-2 pages) consider the following questions:

- What mathematical concepts and/or skills were developed during the lesson?
What prior knowledge or understanding is necessary to understand these concepts and/or skills?
Based on evidence from the student's work, what does he or she appear to understand?
Based on evidence from the student's work, where does the student appear to struggle?
What are you still unsure about? What additional questions/problems/activities might you do with the student to give you a better sense of his/her understanding?
Where might you go next with this student?

Some suggestions:
- Use student work from a lesson where you are in the classroom.
- Take a few minutes to jot down some notes about the lesson as soon as possible afterwards. Doing this will help you with your analysis.
- Cover over/black out the student's name.
- Choose two or three kids to get work from and select only one to analyze. Talk to your clinic teacher about who might be a good choice.

Course Project – Mathematics Lesson, Video, and Reflection

The culminating project for this course is an elementary school mathematics lesson that you will develop, implement, and video record in your clinic placement. You will be required to design a lesson plan that will develop students’ understanding of some aspect of one (or more) of the five content strands in Principles and Standards for School Mathematics (i.e., Number and Operations, Algebra, Geometry, Measurement, and Data Analysis and Probability). Additionally, the lesson plan should incorporate some attention to both the Communication and Problem Solving process strands of the Standards. Other process standards (i.e., Reasoning and Proof, Connections, and Representation) may be incorporated as well. The lesson should also attend to the NCTM Focal Points for the grade level. Additional requirements are included in the full description and rubric.

The project will require that you work closely with your cooperative teaching in selecting an appropriate topic for your lesson plan. The lesson plan may be geared for the whole class or a small group of students. You are encouraged to begin with a “found” lesson plan (e.g., a plan suggested by your cooperating teacher, a plan found on the Internet, a plan found in a book) and then adapt it to meet the needs of your students and the requirements of the assignment. It is also okay to develop a lesson “from scratch.”

An initial draft of the lesson plan will be peer-reviewed during class. A working draft of the lesson plan will be turned in and feedback will be given. You will have the option of revising your original lesson plan before and/or after teaching the lesson. You will teach and video record the lesson in your clinic placement. Following the instruction of the lesson, you will watch your video and write a reflective paper that critiques the entire process of developing, teaching, and revising the lesson. The final version of the lesson plan and the reflection will be turned in for grading and will be posted to your Taskstream portfolio.

Overview of Project Components and Due Dates:

- **Initial Draft of Lesson Plan due September 23**
  - The initial draft of the lesson plan is due in class on September 23 so that you can get constructive feedback from one or more of your peers in the methods class. Please be aware, you need to have as much completed as possible prior to this class.
  - This draft will **NOT** be turned in and will **NOT** be graded.

- **Working Draft of Lesson Plan due September 30**
  - A working draft of your lesson plan is due on September 30. This working draft will receive written feedback and will be returned to you by October 7. (If you need feedback sooner than October 7 or would like verbal feedback, you will need to make individual arrangements.)
  - The working draft will be graded using a rubric that can be found in the detailed assignment description.

- **Final (Revised) Lesson Plan due October 26**
  - You have the opportunity to revise the working draft of your lesson plan. You may revise the initial draft before and/or after you teach. The revised plan is due on or before Oct. 26 and will be graded using the same rubric used for the working draft.
- **Video due October 26**
  o You will be required to videotape the ENTIRE lesson that you teach. After viewing your video recording and reflecting on the whole lesson, you will select a 10-12 minute continuous segment from your video recording to submit. The video segment is due on or before October 26.
  o The video component is a vehicle for you to learn. The video is not expected to be professional quality and the lesson is not expected to go perfectly. It will not be graded on whether the lesson is “good” or not. Rather, it provides another way for you to reflect on your teaching.
- **Reflection due October 26**
  o A 2-4 page typed reflection paper will be due on or before October 26. The reflection paper is not a description of what occurred while you were teaching the lesson. Rather, the reflection paper is a critical analysis of your own pedagogical reasoning and action. Details will follow.
  o There will be two parts to the reflection paper. In the first part, you will reflect on the lesson as a whole. in the second part, you will reflect specifically on the 10-12 minute segment you chose to submit. More details can be found in the description of the reflection assignment.

### COURSE CALENDAR

**Key to abbreviations:**

- ✓ NCTM = National Council of Teachers of Mathematics
- ✓ PSSM = NCTM Principles and Standards for School Mathematics
- ✓ FP = NCTM Curriculum Focal Points
- ✓ MM = Math Matters: Understanding the Math You Teach (text)
- ✓ SIOP = Making Content Comprehensible for English Learners: The SIOP Model

Assignments are **due** on the listed dates at the beginning of class. Additional readings and assignments will be announced during the class or via email. This schedule includes only the basic topics and associated readings. Problem solving, communication, technology, manipulatives, learning theories, assessment, differentiation, etc. will be integrated throughout the course. **You will be informed of changes in the schedule by email and/or in class.**

**NCTM Standards Reading:** Within the online version of the NCTM PSSM, there are links to chapters and topics. When looking for reading assignments, I suggest that you use topic links within the designated chapter (page numbers are listed in the left-hand margin on the website, but they don’t match perfectly). Although particular NCTM Standards will be focused on each session in reading and discussion, activities may represent more than one content and process Standard.

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<thead>
<tr>
<th>Date</th>
<th>Topics</th>
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| Day 1 Aug. 30 | • Introductions  
• Course Overview, Expectations  
• Process Standards: *Communication & Problem Solving* | ✓ Come ready to participate |
| Day 2 Sept. 2 | • Process Standards: *Communication and Problem Solving*  
• Content Standards: *Numbers & Operations* (counting, number properties, place value) | ✓ Read syllabus  
✓ Discussion Board #1: Post comments &/or questions on Intro & Overview of PSSM by 11 p.m., Wed., Sept. 1  
✓ Read handouts on Communication & Problem Solving |
| Day 3  | Sept. 7  | • Process Standards: *Communication and Problem Solving*  
| Day 4  | Sept. 9  | • Content Standard: *Numbers & Operations* (Focus on + & -)  
| Day 5  | Sept. 14 | • Content Standard: *Number & Operations* (Focus on x & div)  
| Day 6  | Sept. 16 | • Content Standard: *Number & Operations* (cont’d, fractions, decimals, percents, etc.)  
| Day 7  | Sept. 21 | • Content Standards: *Algebra*  
| Day 8  | Sept. 23 | • Lesson Plan Workshop  
| Day 9  | Sept. 28 | • Content Standard: *Data Analysis & Probability*  
| Day 10 | Sept. 30 | Wrap things up.  |

- **Read MM**, Ch 1, pp 1-20 & Ch 2, pp 31-48 (notice “analyzing student thinking” – pp. 45-48), Ch 3, pp 55-67
- **Discussion Board #2**: Post comments &/or questions on *Math Matters* reading (Ch. 1-3) by noon, Monday, Sept. 6
- Read Classroom Discussions (distributed in class) – focus on “talk tools”
- Read PSSM, *Number & Operations*: Ch 3, Overview, pp 32-36; Ch 4, Gr Pre-K-2, pp 78-88
- **Read MM**, Ch 2, pp 49-54; Ch 4, pp 76-94
- Read PSSM, *Number & Operations*: Ch 5, Gr 3-5, pp 148-156
- Read PSSM, Overview of *Connections*, Ch 3, pp 64-66
- **Read NCTM Focal Points**. Attend especially to the grade level of your clinic placement
- **Read SIOP book**, Ch 2, pp 22-31
- **Discussion Board #3**: Post comments &/or questions on *NCTM Focal Points & SIOP* reading by noon, Mon., Sept. 13
- **Read MM**, Ch 5 (fractions), pp 99-132
- **Read MM**, Ch 6 (decimals), pp 133-148
- **Read MM**, Ch 7 (percents), pp 149-164; Ch 8 (ratios), pp 165-174
- **Analysis of Student Work due**
- **Read MM**, Ch 3, pp 68-75 (+ & - of signed numbers); Ch 9, pp 190-210 (algebraic reasoning)
- Read PSSM, Overview of *Algebra*, Ch 3, pp 37-40; Overview of *Representation*, Ch 3, pp 67-71
- **Initial Draft of Lesson Plan for Peer Review Due**
- **Read MM**, Ch 10 (geometry), pp 220-237 & 243-244; Ch 11 (spatial sense), pp 248-257; Ch. 12 (measurement), pp 271-288
- **Discussion Board #4**: Post comments &/or questions by midnight, Sept. 26 → topic TBA
- **Read MM**, Ch 13, pp 294-310; Ch 14, pp 322-334
- Read PSSM, Overview of *Data Anal. & Prob*, Ch 3, pp 48-51
- **Working Draft of Lesson Plan Due** (this will be graded & returned by Oct. 7)
- **Video, Lesson Plan Revisions & Reflection Due on or before Oct. 26**