Fall 2014 Math Methods EDEC 205-25
Hirt- Room U306
Monday/Wednesday 5:15-6:55 PM

Instructor: Ms. Melinda Heasley
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Office Hours by appointment ☺ Room 300i

REQUIRED TEXT:
Van DeWalle, John A., **Elementary and Middle School Mathematics: Teaching Developmentally (8th Edition)**, Pearson Education, 2012
Option: Field Experience Guide prepared by Jennifer M. Bay-Williams.

ADDITIONAL REQUIRED MATERIALS:
* A calculator, markers, scissors, ruler (standard and metric) and a 2 in. or larger 3 ring binder. Please bring to every class unless otherwise advised.

PERIODICAL SOURCES:

Arithmetic Teach	Mathematics Teacher	NCTM News Bulletin	Learning
Teaching K-8	Instructor Magazine	Mailbox Magazine	Teaching Children Mathematics

COURSE DESCRIPTION
This course is designed to review mathematical content, present and explore methodology and instructional materials for a contemporary elementary mathematics program. It stresses the use of knowledge obtained from learning theory, various selecting, preparing, organizing and finally presenting mathematical content for elementary children. A PRACTICUM IS REQUIRED!

COURSE GOALS
The overarching goal of this course is to help you develop understandings of good school mathematics and practices of sound elementary mathematics teaching that will serve as resources throughout your teaching career. In particular, we will be focusing on the idea that good teaching fundamentally involves being *actively responsive to students' mathematical thinking.* We will be engaging and exploring elementary school mathematical concepts and ideas, how children make sense of and learn mathematics, how to promote that learning by understanding and meeting the needs of diverse learners, and how to plan for and assess that learning on a daily basis. We will be drawing upon findings from research on mathematical thinking, learning and teaching, as well as your classroom field experiences to ground our exploration. Throughout, to support your development as a reflective practitioner, you will be expected to think critically about your engagement with mathematics and your engagement with students about mathematics.

COURSE OBJECTIVES

- Learn to closely attend to and analyze students' mathematical thinking in order to create instructional experiences that appropriately support learning.
- Understand the central concepts and structure of mathematics and create problem solving experiences that make mathematics meaningful for students.
- Understand how children learn and develop mathematical understanding and create learning opportunities that support their development.
- Understand how students differ in their approaches to mathematics and mathematics learning and create equitable learning opportunities that respond to their diverse needs.
- Understand and use a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.
- Learn effective verbal, nonverbal, and media communication techniques to foster a mathematical learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
- Plan instruction based upon knowledge of mathematics concepts and content, students' mathematical understanding and prior knowledge, and curriculum goals.
- Understand and use formal and informal assessment strategies to evaluate mathematical understanding, plan instruction, and ensure continuous progress.
- Reflect on your practice and evaluate the effects of your choices and actions on others (students, parents, and other professionals)

Objectives listed above reflect the Chapter 354 Education Content Standards for teacher education programs. Prospective teachers should become familiar with these standards which are listed on the PDE website at www.teaching.state.pa.us/354guide.pdf.

The Education Department has identified six learning outcomes that all education majors should meet before they earn their degree. The table below lists all six departmental outcomes, identifies which outcomes are met in this course, and describes how the instructor will assess whether or not you have met the outcomes met in this course.

LEARNING GOALS & OUTCOMES

The Education Department Early Childhood/Special Education faculty has developed six-broad based learning outcomes that serve as the framework for the program's curriculum.

Upon completion of the pre-service teacher preparation program, graduates will be able to:

1. Create and facilitate a quality lesson plan. ** Assesssed in practicum. See details in section I.
2. Articulate a personal teaching philosophy statement.
3. Assess PreK - 4 Early Childhood and PreK - 8 Special Education student performance. *Assessed in Student Profile. See details in section VIII.
4. Demonstrate personal ethical and professional standards in a school setting. **Assesssed in practicum. See details in section I.
5. Plan for and implement differentiated instruction for students with special needs in a PreK – 4 Early Childhood and PreK – 8 Special Education.
6. Demonstrate knowledge of best practices associated with child development, teaching and learning in a PreK – 4 Early Childhood and PreK – 8 population.

COURSE LEARNING EXPERIENCE REQUIREMENTS

I. Practicum

- Plan instruction based upon knowledge of mathematics concepts and content, students' mathematical understanding and prior knowledge, and curriculum goals.
- Learn effective verbal, nonverbal, and media communication techniques to foster a mathematical learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
- Understand and use formal and informal assessment strategies to evaluate mathematical understanding, plan instruction, and ensure continuous progress.

A practicum of at least four (4) hours is a requirement for this course. There will be one (1) hour of teacher observation, (see section VII for further details) and three (3) lessons taught.

Three whole group math lessons will be taught during the Carpe Diem after school program at McKinley or Lincoln Elementary. The lab will consist of three sessions of instruction from 3:00-4:00 pm. This will be scheduled close to mid term.

During each scheduled lesson time, pre-service teachers are expected to be in the classroom for at least an hour and will work as an aide during time not spent teaching. That is a total of four hours spent in the classroom. The classroom observation may be scheduled through the instructor or in a K-4 classroom approved by the instructor and the placement office. A documented classroom observation project will be expected in conjunction with the time spent in the classroom.

All practicum requirements must be filled in order to pass this course. A failure in the practicum will result in a failure of the course. There are no excused absences for the practicum other than illness or emergencies (documentation must be provided) with a minimum of one hour prior notification to the instructor and classroom teacher.

- The first classroom hour is an observation of a classroom teacher instructing a mathematics lesson. This will be conducted in an elementary setting. Practicum students will complete an observation write up during this time, the format of which the instructor will provide.
- Three (3) mathematics lessons are required to be written and taught, these will be whole group lessons.
- These lessons will be exciting, instructional and developmentally appropriate to the grade level.

Practicum students are expected to provide Ms. Heasley (via email mheasley@eriesd.org) with a copy of their **first lesson plan only at least twenty-four (24) hours *before* they are to teach the lesson.

**The remaining two lesson plans will be available for my signature during the lesson.

- Three lesson plans written in the Mercyhurst Education format are to reflect the best practice teaching methods and strategies taught in this course. (**formative assessment**, cooperative groups, good questioning).
- Lesson plans will include National Common Core Standards in expanded form found: http://www.corestandards.org/Math/Practice
- This evaluation requirement is true even if this practicum is in a PIPing situation.
- Pre-service teachers are required to complete the **self evaluation portion** of the Mercyhurst lesson plan for each math lesson taught.
- These evaluation and self reflection forms will be a part of your practicum portfolio.

- **The pre-service teacher will complete a final overall two page reflection paper.**
- **This reflection chronicles your progress and learning throughout the practicum experience.**

Please place all practicum requirements in chronological order in a pocket folder with your name. These should be picked up in the adjunct office after final grades are posted. If it is still there at the start of the new term it will be disposed of. **COMPLETION DATE:** Nov. 19, 2014

II. MATH GRAPH: Prepare an attractive/kid friendly graph for the beginning of class. This can be on any topic and can be in any graph form. You must provide the graph and materials with a brief written description to hand-in including your name, date, title and materials needed. You must present and teach this as if you were in an elementary classroom. A copy of the outcome of the completed graph should be completed before turned in. (Graph needs to be premade for display. Do NOT use the dry ease board.)
COMPLETION DATE: Sign Up Sheet. (Sign up for only one activity) ☺

III. EXIT JOURNAL SLIPS: An EXIT slip will be given after certain lectures to reflect on the material covered or pose a mathematical question pertaining to the topic given. This type of journaling will provide examples of each. Exit slips will be 5 pts and must be completed even if you are not in class. An estimated 5 are scheduled during the course. Some chapter study guides and/or chapter questions assigned out of class in preparation for the following lecture may be collected for points under the EXIT SLIP category.

IV. REFLECTIVE MEMO ON YOUR MATHEMATICAL EXPERIENCES: 10 points
Each class participant is to write a reflective memo on your mathematical experiences. You may treat this like a 'mathematical autobiography' but I would like you to pay particular attention to your experience as a math student, as children in elementary level classrooms, and your experiences and observations working in classrooms (or with students) has shaped your understandings of math, math teaching and math learning. In short, reflect on how your experiences shape what you think and know about math teaching and learning. Autobiographies will be evaluated by the course instructor.
COMPLETION DATE: September 3, 2014

V. MATH RESEARCH: You will research one current mathematics topic and cite 5 resources that support that topic. The five resources must be current from 2004-2014. This assignment is limited to a 2 page, 12 font, including works cited following the Mercyhurst guidelines.
COMPLETION DATE: September 15, 2014

VI. LITERATURE/ MATH INTEGRATION: You will choose one piece of children's literature that connects with a math concept. You will summarize the book and plan an activity that integrates the story and the math concept. You will email a copy of this summary and activity to me so I may compile a resource for your classmates. You need to bring a hard copy to turn in that night.
COMPLETION DATE: October 1, 2014

VII. LESSON ANALYSIS AND DATA COLLECTION; (Included in your practicum)
Each class participant will be asked to analyze and reflect on a math lesson you observe in your practicum classrooms. This will be an opportunity to think about the mathematical goals of the lesson, the nature and quality of the teacher and the students' interactions, how the teacher used different resources in the lesson and how the teacher assessed students' understandings during classroom activity.
COMPLETION DATE: November 5, 2014

VIII. STUDENT PROFILE:

- Understand and use formal and informal assessment strategies to evaluate mathematical understanding, plan instruction, and ensure continuous progress.

For this assignment, each participant will be assessing one child's understanding of particular content areas (e.g., number sense, computation, spatial sense, etc.). You will need a student to develop your student profile, so be sure to get started on this activity well before it is due. Using the text as a guide, you are to develop a series of questions and assessment tasks that will help you better understand your child's conceptual understanding and procedural knowledge of the area you selected. You should use several sources of data for your assessment of the student's conceptual understanding. The development of the profile should include these steps:

a. Early in your placement observe the class with this profile in mind. Carefully select one or two students whom you might work with. Discuss this profile assignment and these students with your practicum teacher, asking for his/her recommendations to help you make the final selection.

b. Observe your student on at least two occasions. Take notes that will help you to better understand the student's performance, aptitude, cognitive development, and interest in mathematics.

c. Develop a plan of written and interview questions that will help you assess the child's understanding in the areas that you have selected. This set of questions/assessment tasks should include longer open-ended tasks as well as shorter performance tasks that ask the student to use problem solving in his/her work.

d. When you have compiled your questions and assessment tasks, arrange with your practicum teacher for a time to work with the student. Depending on the age and development of the child, you may need to divide your interview into two sessions. You should aim for around 30 minutes (minimum) of one-on-one time with your student. During your interview, use your time to probe the child's understanding by asking questions that elicit explanations of his/her thought processes. Look for possible misconceptions, conventions, creative thinking, strategies, etc.

e. Write up a description of your interviews with the child for your own use. Do you have a complete picture? If you still have questions about the student's understanding, strategies or attitudes, arrange a follow-up interview. Bring manipulatives, questions, or other assessment tasks to clarify your understanding of the child's development.

f. Written report should include:

- A description of your interviews with the student (list questions, tasks, discussion)
- An analysis of your student's performance on the content topic(s) you've chosen
- A summary of the student's strengths and weaknesses in that area which include misconceptions, procedural and concept knowledge, and problem solving ability/strategies
- Your estimate of where your student is on a continuum leading to mastery
- Your conclusions and recommendations (based on your evidence) of what additional learning experiences this child needs in order to more fully grasp the content strand under study.

COMPLETION DATE: November 12, 2014

IX. INTERACTIVE MATHEMATICS GAME: You will either invent or "borrow" a math game from another source. <u>You will need a copy of the game for each classmate</u>. You need to include the title, an explanation of the math concept or the standard that is being reinforced, the appropriate materials, grade level for your game, a brief/clear description of the rules and your source. (If the game is NOT your original work.) All materials for this game MUST be readily available for

any classroom. *Do not use board games or games that need a computer. You will teach this game to the Methods class at the end of the lecture night on your sign up date. This should be at least a 20 minute lesson including directions and time for playing. You must present and teach this as if you were in an elementary classroom.

COMPLETION DATE: Sign up for a date.

X. MATHEMATICS NOTEBOOK/BINDER: You will need to keep a "MATH NOTEBOOK" of all materials acquired during this course. (A 2 in. 3 ring binder is suggested.) You need to include all instructor handouts and activities, peer handouts, etc. You will be graded on your table of contents, divider pages, organization and completeness, neatness and presentation.

COMPLETION DATE: December 1, 2014

XI. QUIZZES: Due to the large amount of information in the text, there will be 6-7 quizzes given throughout this course covering the material of no more than 2 chapters. These quizzes will replace the midterm and final test. Each quiz will be given after the chapters are taught and discussed at the beginning of the next class session. They will range from 10-15 points each.

XII. ATTENDANCE/PARTICIPATION: ATTENDANCE IS REQUIRED!!!!

Due to the interactive design of this course, a student must have consistent attendance to achieve maximum learning and understanding. If you have **two** absences, your final grade may be lowered half a letter grade and half for each additional absence.

If you miss four classes, you fail the course!

There are times that you will miss a class for an ordinary reason: illness, family commitments, job interviews, etc. The policy allows for ONE such absence without penalty. If you are absent due to extraordinary circumstances, extended illness, family crisis or death etc., please let me know ASAP. Grade penalties do not apply but documentation is required. If you do miss class, it is your responsibility to find out from a classmate what you missed, what is due and to make up any work. *You MUST email me prior to missing class.

XIII. READING: Students are expected to come to class having read all assigned textbook and supplemental readings, manipulative readings and be prepared to discuss them and to actively participate in related class activities.

Common Core standards http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf
or http://www.corestandards.org/Math/Practice

NCTM standards can be found at http://standards.nctm.org/

Other mathematics info is available on the Mercyhurst web page: www.education.mercyhurst.edu

☺CLASS STANDARDS FOR MAINTAINING PROFESSIONALISM.

* All required assignments must be turned in by the COMPLETION DATE.
* Assignments may be turned in before the due date. A penalty for late work will be one letter grade reduction for each class late. Your final grade will be lowered one letter grade for not completing an assignment.
* All required assignments must be well written using a word processor.

(12 point font, double spaced with one inch margins.)

Attractive presentation, neatness, proper grammar and spelling are expected.

Points will be deducted for inferior work. ☹

***THE PRACTICUM EXPERIENCE OF THIS COURSE IS MANDATORY. YOU CANNOT PASS THE COURSE IF YOU DO NOT COMPLETE THE PRACTICUM REQUIREMENT.**

REFLECTIVE MEMO 10PTS MATH RESEARCH 25 PTS MATH GRAPH 10 PTS MATH LITERATURE LESSON 25 PTS LESSON ANALYSIS 25PTS STUDENT PROFILE 50 PTS. INTERACTIVE GAME 25 PTS. MATH NOTEBOOK 20 PTS CHAPTER QUIZZES 10-15 PTS EACH EXIT JOURNAL SLIPS 5 PTS EACH PRACTICUM 100 PTS	GRADING: A 95% and above B+ 90%-94% B 85%-89% C+ 78%-84% C 70%-77% D+ 65%-69% D 60%-64% F Below 60 % ☹

***Please follow score sheets/rubrics for all assignments!**

ASSIGNMENT DUE DATES: SCORE:

REFLECTIVE MEMO: September 3, 2014 _____/10
MATH RESEARCH: September 15, 2014 _____/25
MATH LITERATURE LESSON: October 1, 2014 _____/25
LESSON ANALYSIS: November 5, 2014 _____/25
STUDENT PROFILE: November 12, 2014 _____/50
PRACTICUM PORTFOLIO: November 19, 2014 _____/100
MATH NOTEBOOK : December 1, 2014 _____/20
MATH GRAPH: SIGN UP _____/10
MATH INTERACTIVE GAME: SIGN UP _____/25
EXIT JOURNAL SLIP #1 _____/5
#2 _____/5
#3 _____/5
#4 _____/5
#5 _____/5
QUIZ CH 1 &2 _____/
QUIZ CH 3&4 _____/
QUIZ CH 5&6 _____/
QUIZ CH 7&8 _____/
QUIZ CH 9 _____/
QUIZ CH 10 _____/
QUIZ CH 11&12 _____/

SIGN UP DATE:
MATH GRAPH: _____
MATH INTERACTIVE GAME:_____

Date: 2014	Lecture 5:15-6:55 pm.	Assignment
W-Aug. 27	Syllabus/ Course Info./ Practicum/Graph/Game sign ups	*Assign Reflective Memo CH. 1 Study Guide
M-Sept. 1	*Out of Class Assignment:* CH. 1 21st Century Math/ Common Core Standards	Assign CCS link 5 CC Big Ideas
W-Sept. 3	CH. 1 21st Century Math/ Common Core Standards *Reflective Memo Due	Assign CH. 2 Study Guide *Assign Math Research
M-Sept. 8	CH.2 Exploring What It Means To Do Mathematics	Chapter 2 EXIT SLIP
W-Sept. 10	Ch. 2 Continued	*Assign Lesson Analysis Assign CH 3 Studyguide
M-Sept. 15	Quiz Ch. 1&2/ CH.3 Problem Solving *Math Research Findings Due	
W-Sept. 17	CH. 3 Problem Solving cont. Demonstrate Children's Literature	EXIT SLIP: Video Assign CH 4 Studyguide
M-Sept. 22	CH. 4 Planning a Problem Based Classroom	Assign. CH 5 Studyguide
W-Sept.24	Quiz CH. 3&4/ CH. 5 Assessment	
M-Sept. 29	Ch. 5 Assessment cont.	Assign. CH 6 Studyguide
W-Oct. 1	CH. 6 Teaching Equitably to All Children *Children's Literature Due	Assign. CH 7 Studyguide
M-Oct. 6	Quiz Ch. 5&6/ Plan practicum lessons	Practicum Planning
W- Oct. 8	Mid-Semester Break- No Class :(	
M- Oct 13	Chapter 7 Technology/ Plan practicum lessons	Practicum Planning/EXIT Slip
W- Oct 15	Using Technology Tools -Class held @ Perry Elementary for technology demonstration. PRACTICUM: Carpe Diem Program 3-4 pm.	Class held from 5:15-6:30 pm. Assign. CH 8 Studyguide
M- Oct. 20*	PRACTICUM: Carpe Diem Program 3-4 pm.	Complete CH 8 Studyguide
W-Oct. 22	Ch. 8 /Review Student Profile PRACTICUM: Carpe Diem Program 3-4 pm.	Assign. CH 9 Studyguide
M-Oct. 27	Quiz Ch. 7&8/ Chapter 9 Meanings for Operations	
W-Oct. 29	Chapter 9 cont	CH.9 EXIT Slip Assign. CH 10 Studyguide
M- Nov.3	OUT OF CLASS ASSIGNMENT CH 10 Studyguide-COMPLETE	Make place value flip book for Ch. 11
W-Nov. 5	Quiz Ch. 9 Chapter 10 Helping Students Master Basic Facts *Lesson Analysis Due	CH.10 EXIT slip Assign. CH 11 Studyguide
M-Nov. 10	Quiz Ch.10 Ch. 11 Whole Number Place Value	Assign. CH 12 Studyguide
W-Nov. 12	Chapter 12 Strategies for Addition & Subtraction *Student Profile Due	
M-Nov. 17	Chapter 11 & 12 Quiz	Assign. CH 13 Studyguide
W-Nov. 19	Chapter 13 Strategies for Multiplication and Division * Practicum Due	Big Ideas: Chapters 15 & 19
Nov.24th&26th	No Class- Thanksgiving Break	
M-Dec. 1	Chapter 15 Fractions /Chapter 19 Measurement/ Misc. *Binders Due	
W-Dec. 3	Manipulatives: LAST CLASS!	Binders Returned