**Mathematics / Mathematics Education 228 Section 1**
**Tentative Syllabus, Spring Semester 2017**

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**Place and Time:**
Section 1
M 8:00-9:50 am, Sci. A213
W 8:00-9:50 am, Sci. A212

**Instructor and Office Hours:**
Dr. Senfeng Liang
Office: D329 Science
Email: sliang@uwsp.edu
Monday 10:00 pm– 11:50 pm; Wednesday 11:00 – 11:50 am, or by appointment

If you need to meet me, notify me in advance (check the google link). Please write **math228 _ your full official name** in the subject line of the email. For example, it should look like math228_First name Last name. Always use **full official name** in All communications and Webassign registration (e.g., at the end of an email). **No nick name** please!

**Course Description:**
**MATH 228. Fundamental Mathematical Concepts for Elementary Teachers.** 3 cr. Basic concepts and properties of set, number systems, and functions for elementary school math. Prereq: MATH 100 or placement above MATH 100. GEP: QL*

**M ED 228. Teaching Elementary School Mathematics.** 1cr. Principles, goals, methods, study of curricular content and assessment techniques; includes field experience.

**** This course will fulfill the Quantitative Literacy (QL) requirement as part of the General Education Program (GEP) for education majors only. Because this course is identified as a QL course in the GEP, assignments and assessments may be collected and copied for use in GEP assessment. Names or identifying marks will be removed from copies of collected artifacts.***

**Course Goals:**
The importance of problem solving in the elementary curriculum is clearly established by the emphasis given in the NCTM's *Principles and Standards for School Mathematics* (2000). This course is designed to strengthen your own background in solving problems, develop your ability to promote problem solving (during practicum), and develop your ability to reason and communicate problem solving strategies.

The vision of mathematics as expressed by the National Council of Teachers of Mathematics (above) means that mathematics educators are encouraging extensive changes in mathematics content and its teaching and learning. This course will be consistent with these changes.

**Course Learning Outcomes:**
Selected learning outcomes are:

- Generating the next terms in a sequence
- Analyzing a sequence and identifying it as arithmetic, geometric, or neither
- Developing the nth term of arithmetic and geometric sequences
- Determining how many terms are in a sequence
- Determining the sum of a sequence
- Writing an algebraic expression that reflects a given situation
- Use problem-solving strategies, including using a smaller case to verify your approach

Know what a function is and the various ways functions can be represented
Understanding sets
Understanding multiple numeration system
Convert number among different base systems (especially base ten, five and sixteen)
Understanding addition, subtraction, multiplication and division
Divisibility rules for 2, 3, 4, 5, 6, 8, 9, 10, 11, 12
Theorems 4-1, 4-2 used to determine divisibility
Determining if a number is prime
Determining prime factorization, and GCD, LCM from prime factorization
Understanding the relationship between the GCD and LCM of two numbers, a, b or three number a, b, c
Broaden your personal understanding of basic concepts and properties of operation system, set, number systems, and functions for elementary school math
Become more confident in your ability to teach four operations ideas to children
Become familiar with NCTM standards and Common Core State Standards
Be able to use technology in education

**Required Materials**:

Binders to organize class handouts and assignments; colored pencils, and a scientific calculator (TI-30 type is sufficient; no other media device can be used as a calculator)

**Texts:**

Bassarear, T. (2012). *Mathematics for Elementary School Teachers* (5th ed.). Belmont, CA: Brooks/Cole. (**TEXT RENTAL**)
Van de Walle, J.A., Karp, K.S., & Bay-Williams, J. M. (2012). *Elementary and Middle School Mathematics: Teaching Developmentally* (8th ed.). Boston, MA: Pearson. (**TEXT RENTAL**)
National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics.* (one copy provided to you for all mathematics education courses)
State of Wisconsin Department of Public Instruction. *Common Core State Standards for Mathematics.* (one copy provided to you for all mathematics education courses)

**Additional Readings:** will be provided as handouts (in paper or electronic version).

**Tentative Course Requirements:**

*1 Test/Final:*
There will be a midterm and a final. The test and final dates are provided in the schedule. You should avoid making travel plan on these days. For a test you will need to let me know at least two days in advance (barring medical emergency) that you will miss the test.

*2 Homework* (see class responsibility #5 for more information):
Homework will include assignments from webassign website, labs, and sometimes other problems. More information about webassign will be provided. For some questions (may include problems from webassign), you will be required to write down your solution and present during class. There will be multiple Labs is the class. Webassign information:

Math 228, Section 1 - Spring 2017: uwsp 4761 2687

3 *Teaching Practicum*
During the course of your time in a local school classroom, you will prepare and teach for three lessons in three days (to be assigned). The lesson plans should demonstrate creativity, knowledge of mathematics, knowledge of mathematics pedagogy, and knowledge of generally accepted pedagogical practices. The lessons plans can be

related but should be essentially different. After you finish the teaching, you will write a reflection of each lesson. More specifics about this activity will be distributed later.

*4 Leadership activities:*
As you are all preparing for careers that are likely to involve you as an instructor, this assignment involves the preparation and leading of the discussion/activities for one of the class sessions. You will be working in group of two to prepare and lead one session (50 minutes). Your group is required to meet the instructor at least one week in advance to talk about your preparation (not on Fridays). **When you meet the instructor you should have your lesson prepared.** Times slots will be made by previous Sunday on google drive (remind me if you did not find it or the time slots do not work for you). Fail to meet the instructor during the previous week (or earlier) with a prepared lesson will suspend your opportunity of conducting leadership and will result in a zero point for this activity.
Leadership lesson should include a homework assignment (suggested but not required if you teach the Van De Walle book chapters) that can be finished in about 20-30 minutes. Set the due dates as the beginning of the following week's first class (unless we do not meet due to teaching practicums or other reasons). Update the due date document on google and upload the ppt on google. The leadership instructors then should collect and grade the homework assignments and send me the point grade report in google spreadsheet or excel within one week after the due date (use the template on Google). The homework assignment' points are between 5 to 10 points.

*5 Reading comments:*
You will be required to read several chapters from the book of Van De Walle et al. and other materials. For each chapter/article your read, you need to write at least five comments, questions or reflections (but not summaries) and review at least three other people's comments (be specific). This activity will enrich discussions of these chapters. Peer reviews like this won't count: "I agree with what you said."

*6 Course reflection:*
You will be required to write a reflection about what you have learned from this course by the end this semester.

Note1: Peer-review of writings. For all your writings (except #6 course reflection), for some assignments you will need to review 1-3 papers. The reviews will help the authors to write a stronger report. Thus, even though positive encouraging comments are appreciated it is more valuable to provide the authors with constructive suggestions. Revised writings based on peer-reviews tend to received higher points than those submitted without any insights from others. For writings need to peer-reviewed, we will use google documents. Thus you need to create a google account. **Fail to complete peer-review will result in losing your points substantially.**

**Class Responsibilities:**
*1 Attendance, Participation and Preparation:*
Attendance and full participation are very important for this course. Absences must be documented either medically or justified by other reasons considered valid by the University. Every time your absence is unexcused, you miss 2 points up to 3 absences. If you miss 4 or more classes without a valid excuse, you will not earn any credit for attendance and participation. **You are responsible for all announcements and assignments made in your absence**. Practicum experiences are required for this class. If you miss a practicum experience due to extenuating circumstances, you must make arrangements to make up a missed practicum on your own. Major emergencies will be handled on an individual basis. **Media phone devices are not to be turned on or used during class time.** Activities such as texting messages will results in lose your participation points.

*2 Conduct:*
I will treat you as professionals and I expect the same in return.

*3 Late Homework and make-ups:*

No late homework will be accepted unless you have a reason that the university deems sufficiently compelling. (The same is true for tests.) Even if your homework is accepted, you may lose points for being late. All written assignments must be submitted on or before the time/date indicated.

*4 Academic Integrity:*

"Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students who violate these standards will be confronted and must accept the consequences of their actions." A description of your rights and responsibilities as a member of the UW-SP community can be found at http://www.uwsp.edu/dos/Pages/Academic-Misconduct.aspx

Individual assessments, such as individual assignments and exams, must be completed by you alone. Work completed collaboratively must clearly identify all contributors. *When utilizing outside references, all sources must be fully and accurately cited* (use *APA format*). All essays should be typed, single-spaced with 1" margins on all sides. You must use 12 pt. Times New Roman font. You should learn the APA format at: https://owl.english.purdue.edu/owl/section/2/10/

*5 More information of assignments:*

All essays should be typed, single-spaced with 1" margins on all sides. **You must use 12 pt. Times New Roman font.** You should learn the APA format at: https://owl.english.purdue.edu/owl/section/2/10/

Problems from WebAssign tend to emphasize and reward simply by getting the right answer. The written assignments measure your understanding of the methods and other mathematical aspects of the course. Correct answers are, of course, crucial, but correct answers without supporting work won't count for much here! You need to write clearly! Legible handwritten solutions are critical. Also remember to circle your final answer.

*6 Disability Accommodations:* The Americans with Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with dis- abilities. For more information about UWSPs policies, check here:
http://www.uwsp.edu/ stuaffairs/Documents/RightsRespons/ADA/rightsADAPolicyInfo.pdf

If you have a disability and require classroom and/or exam accommodations, please register with the Disability and Assistive Technology Center and then contact me at the beginning of the course. I am happy to help in any way that I can. For more information, please visit the Disability and Assistive Technology Center, located on the 6th floor of the Learning Re- source Center (the Library). You can also find more information here:
http://www4.uwsp. edu/special/disability/

*7 Religious Beliefs:*

Students' sincerely held religious beliefs will be reasonably accommodated with respect to all examinations and other academic requirements. According to UWS 22.03, you must notify the instructor within the first three weeks of classes about specific dates which require accommodation.

*8 Policies*: UW-Stevens Point values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, a set of expectations for all students and instructors have been developed. This set of expectations is known as the Rights and Responsibilities document, and it is intended to help establish a positive living and learning environment at UWSP. Check here for more information:
http://www.uwsp.edu/dos/Documents/CommunityRights.pdf

*9 Extra credits:* You may earn extra credits in several ways, such as (other opportunities may be possible):

a. If you volunteered to show your work on board you earn 0.5 point for each class. Even if you volunteered twice or more than twice, you earn 0.5 point for each class.
b. No cell phone use in classroom. You earn **FIVE EXTRA POINTS** if you never display a cell phone, other mobile devices, or a laptop, in the classroom. You can keep your devices in your bag but you cannot

take them out for any reason. You should follow the requirement starting at the moment you enter the room until you left the classroom when class formally ends. Break time will be counted as well.

c.

**ASSESSMENT INDICATORS (tentative):**

| *Tasks* | *counts* | *points* | *notes* |
|---|---|---|---|
| Attendance and Participation | N/A | 30 | individually |
| Midterm | 1*100 | 100 | individually |
| Final | 1*150 | 150 | individually |
| Homework | varies | 122 | individually |
| Reading comments | 3*6 | 18 | 2 points for each reading' comments;<br>1 point for peer review |
| Leadership lesson | 1*30 | 30 | in pairs |
| 3 Lesson plans | 3*15 | 45 | in pairs |
| 3 Lesson reflections | 3*15 | 45 | in pairs |
| Course reflection | 1*10 | 10 | individually |
| total | | 550 | |

*One lesson plan and related reflection is a required element of your SOE electronic teaching portfolio. Keep both a hard copy and electronic copy for your portfolio. Points are posted in Desire2Learn. Check D2L through your "My Point" portal under Academics.

Your grade will be assigned based on the following scale:

| | | |
|---|---|---|
| A: $\geq 94\%$ | A - : $\geq 90\%$ | B+: $\geq 87\%$ |
| B: $\geq 83\%$ | B- : $\geq 80\%$ | C+: $\geq 77\%$ |
| C: $\geq 73\%$ | C - : $\geq 70\%$ | D+: $\geq 67\%$ |
| D: $\geq 60\%$ | F: $< 60\%$ | |

NOTE: **The same grade will be assigned for both MATH 228 and MATH ED 228.**

**Besides office hours, there are many resources available to you!**

MATH ROOM: Drop-in help and by appointment; SCI A113; Free!
WRITING ASSISTANCE: Drop-in help and by appointment; TLC; Free!
STUDY GROUPS: Meet with your peers on a regular basis.

**Estimated time needed for this course**

University guidelines suggest that students may need to spend 2-3 hours of preparation outside of class for every hour spent in class. MATH 228/ M ED 228 is essentially a four-credit class, so YOU should expect to spend 8-12 hours each week devoted to studying and preparing assignments for this class. If you experience difficulty in meeting or understanding course expectations, please come in during office hours, or make an appointment to discuss this with me immediately.

4. Webassigment due dates

| |
|---|
| Web HW1 (1.1, 1.2) due on Sun. 2/5 |
| Web HW2 (1.3) due on Sun. 2/12 |
| Web HW3 (1.4, 2.2) due on Sun. 2/19 |
| Web HW4 (3.1) due on Sun. 2/26 |
| Web HW5 (3.2) due on Sun. 3/5 |
| Web HW6 (3.3) due on Sun. 3/12 |
| Web HW7 (3.4) due on Sun. 3/19 |
| Web HW8 (2.1) due on Sun. 4/2 |
| Web HW9 (2.3) due on Sun. 4/23 |
| Web HW10 (4.1) due on Sun. 4/30 |
| Web HW11 (4.2, 4.3) due on Sun. 5/7 |

5. Reading comments due dates

| Dates | Content (Van De Walle, NCTM, Readings etc.) | Comments/peer review due dates | Note |
|---|---|---|---|
| M, 1/30 | 1. Chp1, Teaching math in the 21st century pp.1–10<br>**NCTM Process Standards, pp. 52-71, 116-141, 182-209; (just read it, comments are not required)** | Sun. 1/29 | Google |
| M, 2/6 | 2. Chp 8, Developing early number concepts and number sense pp.128–146 | Sat. 2/4 | Google |
| M, 2/13 | 3. Chp14, Algebra thinking: generalizations, patterns, and functions pp.258–287 | Sat. 2/11 | Google |
| M, 2/20 | 4. Chp 9, Developing meanings for the operations pp.148–168 | Sat. 2/18 | Google |
| W, 3/1 | **NCTM Numbers and Operations Standard, pp. 32-36, 78-88; CCSS-M grade 1-3; (just read it, comments are not required)** | Sat. 3/12 | N/A |
| M, 3/6 | 5. Chp 12, Developing strategies for addition and subtraction computation pp.216–228<br>Chp 13, Developing strategies for multiplication and division computation pp.236–249 | Sat. 3/4 | Google |
| M, 3/27 | 6. Chp 11, Developing whole-number place-value concepts pp.192–214 | Sun. 3/26 | Google |
| M, 4/17 | **Chp2, Exploring what it means to know and do math pp.13–29; (just read it, comments are not required)** | Sat. 4/16 | N/A |

6. Other due dates: Course reflection due on Tue. 5/2; **in class homework assignments (such as leadership lessons) due dates will be announced in classes by leadership lessons' instructors.**

| | | | | |
|---|---|---|---|---|
| | | | Web HW9 (2.3) due on Sun. 4/23 | |
| 14 | M, 4/24 | Practicum 3 review | | |
| | W, 4/26 | Practicum 3 | Lesson 3 reflection: draft due on Fri., 4/28<br>peer-review and final version due on Sun. 4/30<br>Web HW10 (4.1) due on Sun. 4/30 | Google & D2L |
| 15 | M, 5/1 | sec. 4.2., pp. 211-218, *prime and composite numbers**<br>sec. 4.3., pp. 220-230, *greatest common factor and least common multiple* | Course reflection due on Tue. 5/2 | D2L |
| | W, 5/3 | Review | Web HW11 (4.2, 4.3) due on Sun. 5/7 | |
| 16 | M, 5/8 | Review | | |
| | W, 5/10 | Review | | |
| 17 | R, 5/18 | Final exam, 10:15–12:15 | | |

Note:
1. Sections with * are relatively difficult to teach for leadership lessons. If you choose any of them, talk to me TWO weeks before you teach and still meet me one week before you teach. Shaded dates are not available for leadership lessons. You can choose chapters from the white book.
2. Unless otherwise stated, Web assignment, teaching practicum assignment, and reading comments are always due midnight of the designated due dates. For example, Web HW1 (1.1, 1.2) due on Sun. 2/5 means due 11:59pm.

**MARK ALL DUE DATES ON YOUR CALENDAR (DO NOT EXPECT ME TO REMIND YOU THESE DUE DATES).**

3. Teaching practicum due dates

| |
|---|
| Lesson 1 due on Thur., 3/9; Peer-review and final version due on Sat.3/11 |
| Lesson 1 reflection: draft due on Fri., 3/17; peer-review and final version due on Sun. 3/19 |
| Lesson 2 due on Thur., 3/30; Peer-review and final version due on Sat. 4/1 |
| Lesson 2 reflection: draft due on Fri., 4/7; peer-review and final version due Sun. 4/9 |
| Lesson 3 due on Thur., 4/20; Peer-review and final version due on Sat. 4/22 |
| Lesson 3 reflection: draft due on Fri., 4/28; peer-review and final version due on Sun. 4/30 |

| | | | | |
|---|---|---|---|---|
| | | **computation** pp.236–249<br>(Midterm key) | | |
| | W, 3/8 | sec. 3.4a, pp.170-177, *understanding division*<br>sec. 3.4b, pp.177-185, *the scaffolding algorithm* | Lesson 1 due on Thur., 3/9<br>Peer-review and final version due on Sat.3/11<br>Web HW6 (3.3) due on Sun. 3/12 | Google & D2L |
| 8 | M, 3/13 | Practicum 1 review | Lesson 1 reflection: draft due on Fri., 3/17<br>peer-review and final version due on Sun. 3/19 | Google & D2L |
| | W, 3/15 | Practicum 1 | Web HW7 (3.4) due on Sun. 3/19 | |
| 9 | M, 3/20 | Spring break (No class) | | |
| | W, 3/22 | Spring break (No class) | | |
| 10 | M, 3/27 | sec. 2.1a, pp. 53-60, *sets** | | |
| | | **Chp 11, Developing whole-number place-value concepts** pp.192–214 | | |
| | W, 3/29 | sec. 2.1b, pp. 61-65, *sets** | Lesson 2 due on Thur., 3/30<br>Peer-review and final version due on Sat. 4/1<br>Web HW8 (2.1) due on Sun. 4/2 | Google & D2L |
| | | Lab 2 | | |
| 11 | M, 4/3 | Practicum 2 review | Lesson 2 reflection: draft due on Fri., 4/7<br>peer-review and final version due Sun. 4/9 | Google & D2L |
| | W, 4/5 | Practicum 2 | | |
| 12 | M, 4/10 | Sets (supplementary materials will be distributed)* | | |
| | W, 4/12 | sec. 2.3a, pp. 87-94, *numeration (skip Babylonian system)*<br>sec. 2.3b, pp. 99-102, *numeration** | | |
| | | Lab 3 | | |
| 13 | M, 4/17 | sec. 2.3b, pp. 99-102, *numeration (cont.)** | | |
| | | **(Chp2, Exploring what it means to know and do math** pp.13–29) | | |
| | W, 4/19 | sec. 4.1a, pp. 195-202, *number theory (including investigation D)*<br>sec. 4.1b, pp. 202-208, *divisibility rules* | Lesson 3 due on Thur., 4/20<br>Peer-review and final version due on Sat. 4/22 | Google & D2L |
| | | Lab 4 | | |

**Tentative Schedule – Math/Math Ed 228, Spring 2017**

| W | Date | Readings (Bass, Van De Walle etc.) | Assignments due | Note |
|---|---|---|---|---|
| 1 | M, 1/23 | Introduction & Warm-up | | |
| | W, 1/25 | sec. 1.1, pp. 1–9, *getting started and problem solving* | | |
| 2 | M, 1/30 | sec. 1.1b, pp. 9– 13, *problem solving*<br>sec. 1.2a, pp. 14–18, *patterns and communication**<br>**(Chp1, *Teaching math in the 21st century* pp.1–10)**<br>**(NCTM Process Standards, pp. 52-71, 116-141, 182-209)** | | |
| | W, 2/1 | sec. 1.2b, pp. 14–18, *patterns and communication**<br>sec. 1.3a, pp. 26 – 31, *reasoning and proof* | Web HW1 (1.1, 1.2) due on Sun. 2/5 | |
| 3 | M, 2/6 | sec. 1.3b, pp. 32-37 deductive reasoning and intuitive reasoning<br>**Chp 8, *Developing early number concepts and number sense*** pp.128–146 | | |
| | W, 2/8 | sec. 1.4, pp. 39-47, *representation and connections*<br>sec. 2.2a, pp. 68–78, *algebraic thinking* | Web HW2 (1.3) due on Sun. 2/12 | |
| 4 | M, 2/13 | sec. 2.2b, pp. 78 – 81, *algebra as generalized arithmetic**<br>**Chp14, Algebra thinking: generalizations, patterns, and functions** pp.258–287 | | |
| | W, 2/15 | sec. 3.1a, pp. 111-120, *understanding addition; strategies (skip Investigation 3.1A)*<br>sec. 3.1b, pp. 120 – 131, *algorithms* | Web HW3 (1.4, 2.2) due on Sun. 2/19 | |
| 5 | M, 2/20 | sec. 3.2a, pp. 133 – 139, *understanding subtraction mental methods*<br>**Chp 9, Developing meanings for the operations** pp.148–168 | | |
| | W, 2/22 | sec. 3.2b, pp. 139 – 145, *Investigation 3.2B*<br>Midterm Review | Web HW4 (3.1) due on Sun. 2/26 | |
| 6 | M, 2/27 | Midterm | | |
| | W, 3/1 | sec. 3.3a, pp. 148-155, *understanding multiplication*<br>Lab 1<br>**(NCTM *Numbers and Operations Standard*, pp. 32-36, 78-88)**<br>**(CCSS-M grade 1-3)** | Web HW5 (3.2) due on Sun. 3/5 | |
| 7 | M, 3/6 | sec. 3.3b, pp. 152-166, *changes in units (skip investigation 3.3A, 3.3C, 3.3D, 3.3E)*<br>**Chp 12, Developing strategies for addition and subtraction computation** pp.216–228<br>**Chp 13, Developing strategies for multiplication and division** | | |