Math 246 Syllabus | Fall 2017 | Laurel Langford
Mathematics for Elementary Teachers I | laurel.langford@uwrf.edu
Section 2; Credits: 4 | http://langfordmath.com/

Office hours (getting help): I will be available in my office to answer questions (206E NH; office phone 715-425-4360) MWF 11:00-12:30, TR 12:20-1:00. I am around a lot during the day when I am not in class, and I am (almost) always happy to see you (it is a good idea to make an appointment if you are able to plan ahead).

Schedule: We will meet in NH 205 at 2:00 Mon., Wed. and Fri. and in DL 161 at 2:00 Thurs.

Text: you should have the textbook Mathematics for Elementary Teacher by Bennet and Nelson (6 ed.)

Announcements, schedules, assignments and review sheets are posted on my web site: http://langfordmath.com/. I will be posting your scores on D2L. Sometimes there are problems (both human and machine errors). **Please save your graded work until after you have checked your grades in D2L to make sure I have scores recorded correctly.**

Topics :
Sets, Problem Solving and Algebraic reasoning
Whole number concepts and operations
Geometry

Supplies: You will need to have the following supplies at home: ***scissors, tape, colored pencils*** *(or similar), and a* ***ruler****.* An emphasis of this class is arithmetic, so you will *not* be allowed to use a calculator for most assignments and tests.

Grading: Your grade will be based primarily on your scores on homework, projects, quizzes and tests. Homework and projects will count as 20% of your grade. Tests and quizzes will count as 80% of your grade. Your grade will be based primarily on the weighted average of your scores. Letter grades will be at least as high* as those determined by your weighted average and these percents:

A: 94-100%	A-: 90-93%	B+: 87-89%	B: 84-86%	B-: 80-83%
C+: 77-79%	C: 74-76%	C-: 70-73%	D: 60-69%	

*I will occasionally raise a grade for someone who shows a greater understanding of the content (eg. in class discussions) than is reflected in the test scores, but I never lower a grade below what is indicated by the weighted average).

Homework: There will be frequent homework assignments. It's a good idea to study together, but you should write up your work independently so that the work you submit shows your understanding of the problem.

Quizzes There will be some quizzes between exams. Quizzes are worth about 40 points.

Tests: Tests are generally worth about 80 points, and are given in class. I expect to give 2 in class tests, and a (comprehensive) final exam (about 160 pts). Please talk to me in advance if you have special needs for test taking.

Attendance: I do a lot of things that are not in the book, and the only way to get the information is to be in class. I *expect you to be near perfect in being in class on time every class period*. If you are absent or tardy enough for me to be concerned, I will give you a warning, after which I may file a dispositions concern report with the College of Education.

Late work: Late work will be accepted at my convenience. Late work may earn partial or full credit, depending on when it is turned in (see longer syllabus in D2L for details).

The UWRF promotes safe, inclusive and effective learning environments that protect the rights and support the interests of both students and faculty. For additional information regarding our inclusivity expectations, academic accommodations, academic conduct expectations and processes, and other syllabi information, please consult http://go.uwrf.edu/Syllabi

Teacher Content Standards: Information about teacher content standards covered by this course can be found at: https://www.uwrf.edu/MATH/WisconsinContentTeacherStandardsMathematicsCourses.cfm.

An expanded version of this syllabus is available in the Content section of the D2L web site

Appendix/expanded syllabus

More on Late Work: Typically, if the work is turned in before I have a chance to grade that assignment, your work will be graded with the rest of the class. If you turn in work after I have graded the assignment for the rest of the class, you may still get full credit if your work is late due to an excused absence (circumstances beyond your control: illness, car in need of towing on the way to class, etc), and you have documentation verifying the reason for the absence. Vacations are not excused absences. If you do not have a verifiable excused absence, you may still get partial credit (about 50%) if the assignment is complete and turned in before the end of the unit. Once the unit exam test has passed, no late work for the unit will be accepted.

Missed exams can be made up for partial credit (75%) if you contact me promptly (I should hear from you before the next class meeting if you miss an exam), and reschedule to take the exam promptly. I may choose to allow a late exam for full credit in cases of an excused absence (see above). If you are missing an exam for a university sponsored event, you should be contacting me in advance to schedule your test. As with final grades, I may choose to give higher amounts of partial credit depending on the circumstances.

Teacher Content Standards: The College of Arts and Sciences has a webpage that links you to the teacher content standards by course number. " DPI CONTENT STANDARDS: The State of Wisconsin has established content standards that education programs are required to have in their courses. These standards are the basis of the Praxis II Content exams that all licensure candidates are required to pass prior to receiving a license to teach in Wisconsin." Linked by course number from this page: https://www.uwrf.edu/MATH/WisconsinContentTeacherStandardsMathematicsCourses.cfm.

Course Objectives

At the end of this course students will be able to:

- Explain why various mathematical procedures work, as well as carry out those procedures.
- Use appropriate mathematical language and symbols when discussing or writing about mathematics.
- Describe relationships/connections between and among mathematical topics.
- Solve "real-world" application problems from each topic area.
- Use appropriate technology to interpret, model, and solve mathematical problems.

Required Course Content

A. Introduction to Problem-Solving and Representations
1. Polya's process
2. Heuristics/strategies for solving problems
3. Representations/Models used in solving problems
4. Technology applications: Graphics Software - example - Kid Pix *

B. Inductive and Deductive Reasoning
1. Analyzing Patterns and Generalizing
2. Simple Proofs/Proof without words
3. Technology applications: Dynamic Geometry Software - example - Geometer's Sketchpad *

C. Pre-number concepts
1. Set descriptions
2. Relationships between and among sets
3. Set operations
4. Sets as the foundation for numeration
5. Technology applications: Data Generation and Organization Software - example - Tabletop *

D. Numeration
1. Place value
2. Powers and expanded notation
3. Ordering numbers; rounding
4. Physical representations
5. Other numeration systems
6. Extension to decimals
7. Technology applications: Calculators Number Base Software - example - Maya Math *

E. Algorithms
1. Definition and examples
2. Representations
3. Applications
   a. Geometric
   b. Algebraic
   c. Computer (Logo *) - Technology Application

F. Operations on whole numbers and decimals
1. Addition and subtraction
   a. Models and applications
   b. Properties
   c. Standard algorithms
   d. Non-standard algorithms
2. Multiplication and division
   a. Models and applications
   b. Properties
   c. Standard algorithms
   d. Non-standard algorithms
3. Estimation

G. Functions and Graphing
1. Relations and functions
2. Representations
3. Formulas

H. Euclidean Geometry concepts
1. Points, lines, and planes
2. Polygons and Circles
3. Congruence
4. Constructions with technology - example - Geometers' Sketchpad *

I. Transformation Geometry
1. Symmetry
2. Transformations
3. Coordinate Geometry and Transformations
4. Technology Applications - Transformation and symmetry software - examples - Kaleidomania *

J. Measurement Concepts
1. Lengths, perimeter and circumference
2. Angle measure
3. Area and Pick's Theorem
4. Pythagorean theorem, roots/radicals, and applications
5. Technology Applications - Geometry software - examples - Logo / Geometer's Sketchpad *

K. Manipulatives Integrated Throughout Curriculum (A - J0 Including, but not limited to:
1. Counters, snap cubes, and number lines
2. Attribute blocks
3. Base blocks
4. Pattern blocks
5. Cuisenaire rods
6. Geoboards
7. Grids and paper folding
8. Mirror/reflection devices
9. Protractors, rulers, and compasses

* Example Software Only - May use alternative software or applications on the web.

Mode of Instruction: Face to Face

Prerequisites: WPT Math Formula score of 40+, ACT Math score of 20+, or MATH 30 or higher.

Math 246 content list for Fall 2017, with approximate dates:

Weeks 1-2: Sets, Venn diagrams including problem solving

- Introduction to sets and set relationships including subsets, disjoint sets, intersections and unions.
- Describing a set relationships using Venn diagrams, sentences, and set notation
- Using Venn diagrams to represent and solve problems with sets (Quiz)

Weeks 2-4: Patterns and functions, including problem solving and graphing

- Explaining and representing functions with words and algebraic notation, emphasizing connections between visual and algebraic descriptions for growing patterns
- Problem solving strategies for word problems with an emphasis on diagrams, tables and working backwards in solving problems involving patterns, functions and mixtures. Solving with algebraic equations is also addressed.
- The meaning of the equals sign and its importance in teaching mathematics, with an emphasis on writing careful balanced equations.
- Order of operations (Exam at the end of week 4)

Week5: Cognitively Guided Instruction as a research base for teaching number and operations in early grades

- Word problem structures for addition and subtraction
- Relative difficulty of different types of addition and subtraction problems
- Direct modeling, counting and derived facts strategies for addition and subtraction

Weeks 6-7: Algorithms and representations for addition and subtraction with whole numbers

- Using bar diagrams to represent addition and subtraction
- Base 10 representations for whole numbers and decimals, including expanded notations
- Invented and alternate algorithms for 2-digit addition and subtraction
- Representing the standard addition and subtraction algorithms using manipulatives and numbers, with emphasis on making connections between manipulative or visual representations and the traditional numerical algorithm.
- Common error patterns for addition and subtraction. (Quiz)

Weeks 8-10: Algorithms and representations for multiplication and division

- Word problem structures for multiplication and division
- Bar diagram representations for multiplication and division
- Array/area representations for multiplication and the commutative and distributive laws
- Division with remainders
- Invented and alternate algorithms for multiplication and division (emphasis on expanded (partial products) and lattice multiplication and scaffolding division)
- Representing 2-digit multiplication with arrays, with an emphasis on connections with the expanded and standard multiplication algorithms.
- Representing the standard multiplication algorithm and the long division algorithm with manipulatives and numbers, with an emphasis on making connections between the manipulative and numerical representations.
- Common errors and error patterns in multiplication and division(Test)

Weeks 11-14: Shapes and geometry

- Geometric properties and definitions.
- Sorting geometric shapes using 2-set Venn diagrams to show relationships.
- Common errors and misconceptions about shapes and properties
- Angle measurement and angle sums in polygons (deriving and solving problems with angle sum formulas for polygons)
- Symmetry transformations including compositions of transformations
- Congruence by symmetry transformations
- Length and perimeter
- Area (Final exam--cumulative)

Inclusivity, Respect, and Ability/Disability Expectations

1. The University of Wisconsin-River Falls strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment. If you have concerns about such behavior, contact your instructor, the Office of Student Conduct and Community Standards at 715-425-4844, or the Office of Equity, Diversity, and Inclusion at 715-425-3833. For a list of prohibited behaviors and protected classes or to report something that is inappropriate using an online process, go to this page.

2. The University of Wisconsin-River Falls is committed to upholding standards that promote respect and human dignity in an environment that fosters academic excellence and professionalism. Sexual misconduct and relationship violence in any form are antithetical to the university's mission and core values, violate university policies, and may also violate federal and state law. Faculty members are considered "Responsible Employees" and are required to report incidents of sexual misconduct and relationship violence. If you or someone you know has been impacted by sexual assault, dating and domestic violence, stalking, or sexual exploitation, please visit Title IX to access information about university support and resources.

3. The University of Wisconsin-River Falls welcomes students with disabilities into its educational programs, activities, residential halls, and everything else it offers. Those who will need academic adjustments or accommodations for a disability should contact the Ability Services Office. Decisions to allow adjustments and accommodations are made by the Ability Services Office on the basis of clinical documentation that students provide to sufficiently indicate the nature of their situation.

Academic Integrity

Language regarding the University of Wisconsin-River Falls Academic Misconduct code, including a discussion of the appropriate policies and procedures to be followed in any case of potential misconduct, is located here.
"UWS Chapter 14 is the chapter of the University of Wisconsin System Administrative code that regulates academic misconduct" for all campuses in the UW System and outlines the process by which the code is adjudicated.
UWS 14.03 defines academic misconduct as follows:

Academic misconduct is an act in which a student:

- seeks to claim credit for the work or efforts of another without authorization or citation;
- uses unauthorized materials or fabricated data in any academic exercise;
- forges or falsifies academic documents or records;
- intentionally impedes or damages the academic work of others;
- engages in conduct aimed at making false representation of a student's academic performance;
- assists other students in any of these acts.

Examples include but are not limited to:

- Cutting and pasting text from the web without quotation marks or proper citation
- Paraphrasing from the web without crediting the source;
- Using notes or a programmable calculator in an exam when such use is not allowed;
- Using another person's ideas, words, or research and presenting it as one's own by not properly crediting the originator; stealing examinations or course materials;
- Changing or creating data in a lab experiment;
- Altering a transcript;
- Signing another person's name to an attendance sheet;
- Hiding a book knowing that another student needs it to prepare an assignment;
- Collaboration that is contrary to the stated rules of the course, or tampering with a lab experiment or computer program of another student.

If you are suspected of misconduct, you may have questions and concerns about the process. If so, you should feel free to call the Office of Student Conduct & Community Standards at 715-425-4844, send an email, and/or consult its website for additional information.