Math 13900 Mathematics for Elementary Education III Fall 2019

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Welcome (or welcome back) to Mathematics for Elementary Education courses at Purdue!
Course goals are to prepare you to:

- Be a knowledgeable and confident math teacher in the elementary classroom
- Have a deep understanding of the reasoning behind math processes
- Be able to clearly articulate math ideas with correct vocabulary

What is Mathematics? Mathematics is a sense-making activity that **ALL** of you (and your future students) are capable of learning. You will make meaning of the mathematics in this course (and in your career) and help your students do the same.

In this class, you will often be asked to explain your thinking or describe the process you use to solve a problem. Be prepared to detail and explain your thinking clearly. Homework, quizzes, and exams will be graded accordingly.

Official Course Description:
Credit Hours: 3.00. Geometric, measurement and spatial reasoning in one, two and three dimensions as the basis for elementary school geometry. Metric and non-metric geometry, transformation geometry.

I. Learning Objectives:

1. Analyze and evaluate their own understanding and children's understanding of mathematics in the content areas of geometry and measurement.
2. Anticipate multiple methods (correct and incorrect) for arriving at given conclusions involving geometry and measurement concepts.
3. Differentiate between various polygons and other 2-D shapes based on number of sides, length of sides, measures of angles, and other attributes.
4. Find the sum of the measures of the interior angles of a polygon in multiple ways.
5. Draw nets for polyhedra.
6. Recognize, draw, and mathematically justify shapes that tessellate the plane (regular and semi-regular tessellations), naming them with proper notation.
7. Determine area of plane figures, with the ability to prove the area formulas of parallelograms, triangles, and trapezoids as well as describe elementary methods to show the formulas, and surface area and volume of solid figures, also with the ability to justify mathematical formulas for those.
8. Determine dimensions of similar planar figures.
9. Determine surface area and volume of similar solid figures.
10. Create constructions with straightedge and compass that include but are not limited to: angle bisectors, perpendicular bisectors, angle copies, midpoints

II. **Textbook:** Reconceptualizing Mathematics 3rd Edition by Sowder, Sowder, and Nickerson, W.H. Freeman, 2017.

- This book provides activities, discussion ideas, and questions that stimulate a deep level of thinking. We will use this workbook daily in class, and reading the section in the text before class is recommended to assist in achieving a high grade in the course.
- We will also use manipulatives (i.e., attribute blocks, pattern blocks, cubes, Ang-Legs, GeoBoards) to help us understand or demonstrate concepts. These manipulatives will appeal to different learning styles, and you may find them useful in clarifying ideas. Because it will be important to use them in your teaching for the benefit of your students, you will gain valuable experience using manipulatives in this course.

III. **Grading:** Grades consist of three (3) evening exams (100 points each), quizzes (100 points total), homework (50 points), and a comprehensive final exam (150 points). An instruction sheet for determining your grade is available on Blackboard. Note that a point on homework or quiz is not equivalent to a point for the course. The following will note the grading scale, description of graded assignments, and academic integrity expectations:

Course grades are based on the following scale:

%	Grade	Points
98 – 100	A+	> 585
90 – 97	A	> 540
80 – 89	B	> 480
70 – 79	C	> 420
60 – 69	D	> 360
< 60	F	< 360

At the end of the semester, students whose total points out of 600 are within 6 points of an A, B or C, will be considered for the higher grade with a minus if they have missed 5 or fewer class sessions.

- **Homework:** You will turn in homework every class period. *Late homework is not accepted.* Occasions arise to prevent students from attending class. Therefore, your 4 lowest homework scores will be dropped. Homework should be done neatly and with care, all steps must be shown, and multiple pages should be stapled (one point will be deducted from each homework assignment not stapled). Correct answers without work or with incorrect work may not receive credit. The instructor will decide which problems or parts of problems the grader will grade. Only a few problems on each assignment are graded. This means that sometimes the problems selected are the ones you have incorrect or they might be ones that you have correct. Students are encouraged to attend office hours as a way of getting help with assignments or checking answers.

- **Quizzes/Projects:** Quizzes and/or projects will be given frequently. It is wise to review recent lessons as a way of studying for quizzes. Two quiz scores will be dropped to allow for absences. No make-up quizzes are given. Class participation will count towards one quiz grade. Be prepared to volunteer your ideas during class discussions.

- **Exams:** Exams are intended to cover the ideas from the text but not to mimic the homework questions. Questions may require thinking or problem solving not represented by the homework questions.
    - **Exam 1: Thursday, Sept. 12, 2019 from 8:00-9:00pm in PHYS 114.**
    - **Exam 2: Tuesday, October 22, 2019 from 8:00-9:00pm in PHYS 114.**
    - **Exam 3: Tuesday, Nov. 19, 2019 from 8:00-9:00pm in PHYS 114.**
    - Put these dates and times on your calendar. Make-up exams will be given only if you have a valid excuse *with documentation* and Brooke Max has been notified prior to the exam. If you are unable to notify her prior to the exam, *a valid explanation with documentation for the missed exam must be provided*. Unexcused absence from an exam will result in a grade penalty.

Purdue Honor Pledge:

As a Boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – we are Purdue.

- **Academic honesty** is expected at all times. Academic dishonesty could result in a 0 for the assignment or exam or an F in the course. Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breeches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

IV. Logistical Information

- **Course Schedule:** This course will meet Monday, Wednesday, and Friday each week for 50 minutes each day. See the course calendar later in the syllabus for the semester's schedule of class dates.
- **Office Hours:** The instructors of MA 137, 138, and 139 welcome students of any of the three courses to their office hours. A list of those weekly hours and location can be found on Blackboard.
- **Attendance:** It is common courtesy to let your instructor know if you are going to miss a class. However, it is not required. Please discuss illnesses or circumstances that lead to excessive absences privately with the instructor to make appropriate accommodations. With 4 homework scores and 2 quiz scores dropped, most absences should be covered.
- **Calculators:** Another goal of the Mathematics for Elementary Education courses is to be competent doing arithmetic of whole numbers, decimals, fractions, and percentages by hand. Because of this, **No calculators are allowed on quizzes and exams.** Occasionally, a calculator will be useful for homework problems or in-class work. There will also be three quizzes given during the semester called "Arithmetic Skills Quizzes." To be prepared for those, a study guide is available on the course web page.
- **Course Evaluation:** During the last two weeks of the semester, you will be provided an opportunity to evaluate this course and your instructor. At that time, you will receive an official email from evaluation administrators with a link to the online evaluation site. Your feedback is vital to improving education at Purdue. I strongly urge you to participate in the evaluation system.

- **Campus Emergencies:** In the event of a major campus emergency, course requirements, deadlines, and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Information will be available on Blackboard. If a fire alarm sounds, leave the building immediately and collect by the fountain outside. You may dial 911 for a campus emergency.
- **Last Day to Drop a Course:** Tuesday, October 22, 2019 @ 5:00 pm

V. Resources

- **If you find yourself beginning to feel some stress, anxiety, and/or feeling slightly overwhelmed, try WellTrack, https://purdue.welltrack.com/** Sign in and find information and tools at your fingertips, available to you at any time.
- **If you need support and information about options and resources,** please see the Office of the Dean of Students, http://www.purdue.edu/odos for drop-in hours (M-F 8am-5pm).
- **CAPS**: **If you're struggling and need mental health services -** Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and http://www.purdue.edu/caps/ during and after hours, on weekends and holidays, or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.
- Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: **drc@purdue.edu** or by phone: 765-494-1247.
- **For students certified by ODOS adaptive services**
    - If you have been certified by the Disability Resource Center (DRC) as eligible for academic adjustments on exams or quizzes, see http://www.math.purdue.edu/ada for exam and quiz procedures for your mathematics course or go to MATH 202 for paper copies.
    - In the event that you want to be certified by the DRC, we encourage you to review the procedures prior to being certified.
    - For all in-class accommodations, please see your instructor outside class hours – before or after class or during office hours – to share your Accommodation Memorandum and discuss your accommodations as soon as possible.
- **Non-Discrimination Statement**
    - Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Purdue's nondiscrimination policy can be found at http://www.purdue.edu/purdue/ea_eou_statement.html.

MA 13900 Calendar Fall 2019

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1 08/19-08/23	Lesson 1		Lesson 2		Lesson 3
Week 2 08/26-08/30	Lesson 4		Lesson 5		Lesson 6
Week 3 09/02-09/06	Labor Day – No class		Lesson 7		Lesson 8
Week 4 09/09-09/13	Lesson 9		Review	Exam I	No Class
Week 5 09/16-09/20	Lesson 10		Lesson 11		Lesson 12
Week 6 09/23-09/27	Lesson 13		Lesson 14		Lesson 15
Week 7 09/30-10/05	No Class (ICTM)		Lesson 16		Lesson 17
Week 8 10/7-10/11	Fall break – no class		Lesson 18		Lesson 19
Week 9 10/14-10/18	Lesson 20		Lesson 21		Lesson 22
Week 10 10/21-10/25	Review	Exam II	No Class (Night Exam)		Lesson 23
Week 11 10/28-11/1	Lesson 24		Lesson 25		Lesson 26
Week 12 11/4-11/08	Lesson 27		Lesson 28		Lesson 29
Week 13 11/11-11/15	Lesson 30		Lesson 31		No Class (PME-NA)
Week 14 11/18-11/22	Review	Exam III	No Class (Night Exam)		Lesson 32
Week 15 11/25-11/29	Lesson 33		Thanksgiving	Break	No Class
Week 16 12/2-12/6	Lesson 34		Lesson 35		Review
Final Exam Week 12/09-12/13					

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Math 13900 **Assignment Sheet** **Fall 2019**

Text: Reconceptualizing Mathematics, 3rd Edition by Sowder, Sowder, & Nickerson. W.H. Freeman, 2017.
Follow instructions written here in addition to instructions in the text.

Lesson	Section	Title	Page	Problems
1		*Intro to Attributes/Pre-Test*	Packet	1, 2 (use the set of 30 pieces from the packet – including rectangles), 3, 4 & *Individual Conference Sheet*
2		*Attributes*	Packet	7, 10, 12, 13a, 15
3		*Angles Part I*	Packet	1, 2, 3ac, 4, 5
4		*Angles Part II*	Packet	7, 8, 9ac, 10, 12, 13, 14
5		*Parallel and Intersecting Lines*	Packet	1bf, 4, 5, 8, 9, 11ac, 12abcd (just 2 pairs of each)
6		*Polygons*	Packet	2, 3, 4, 5c, 6, 8acd, 9, 10, 11ac
7		*Classifying Triangles*	Packet	1a, 2, 3, 6, 7, 9, 12
8		*Constructing Triangles Part I*	Packet	1, 2, 4, 5
9		*Constructing Triangles Part II*	Packet	6, 7, 9, 11, 12, 13
Exam 1: Thursday, September 12, 2019 from 8:00-9:00pm in PHYS 114.				
10		*Classifying Quadrilaterals Part I*	Packet	1, 2, 3ac, 4aceg, 6, 7aceg, 9 (Riddle 1 only)
11		*Classifying Quadrilaterals Part II*	Packet	3bd, 4bdfh, 5b, 7bdf, 8, 9 (Riddle 2 only), 12
12		*Interior Angles of Polygons*	Packet	3, 5, 6, 7, 9, 13, 15
13		*Tessellations*	Packet	2 (use at least ½ sheet of unlined paper), 3 (use at least ½ sheet of unlined paper), 6a, 7, 8 *Download GLOBE Observer App for the next class.*
14		*Visualization Part I*	Packet	2, 3a, 4a, 7ac, 8
15		*Prisms*	Packet	1, 2, 3 (draw just 2 of them), 4, 5a, 6, 8ad, 11 *Bring isometric dot paper for Lesson 16*
16		*GLOBE/NASA Lesson*		Read Article on Blackboard and complete the Reflection Questions

17	17.1	*Shoeboxes have faces and nets!*	p. 431	1, 2, 3, 4, 5ab (Draw front, right, top, and left for each.), 6ab, 7; Also do p. 433 Activity 3 – follow the instructions
18	17.3	*Representing and visualizing polyhedra*	p. 441	3, 4abc, 5cd, 7, 8, 10ac, 14a, 16a, 17a, 19bc *Bring isometric dot paper for Lesson 18*
19	17.4	*Congruent polyhedra*	p. 446	1(Use isometric dot paper; Shade 2 cubes to right in I and 2 cubes on top in J), 3, 4, 6, 9(Use unlined paper to draw a LARGE quadrilateral with no equal sides or angles, each side length 5 cm or greater. Draw the second figure upside down.)
20	18.1	*Symmetry of shapes in a plane*	p. 457	1, 4bdf, 5bde, 6, 7bd, 8bde, 11, 12
21	22.6 & 23.1	*Issues for learning: Promoting visualization in the curriculum*	p. 549 & 555	p. 549: 1, 2, 4(Label the pictures 1, 2, 3 for reference.), 5(Create a core square without rotational symmetry; then create your pattern by rotating it.), 7 p. 555: 1bdfhj, 2bdfhj, 4bcfhjln, 5bdf, 6b, 8bcd, 9efgh, 10
22	23.1	*Key ideas of measurement*	p. 556	12(no exp), 13, 14acd, 15, 16bdfh, 17bd, 18bd, 19, 22bdf, 23, 25
23	23.2	*Length and angle size*	p. 564	1c, 3, 4, 5, 6bdhi, 7a(name 10) c(name 6), 9, 12, 14, 16bdfh, 17, 18ac, 20, 22b, 24, 25bdf, 26defg
Exam 2: Tuesday, October 22, 2019 from 8:00-9:00pm in PHYS 114.				
24	21.2 23.2	*Construction/ Length and angle size*	p. 508 p. 564	#1, 3a, 5cd, 6, 8xy, 9, 12, 19, 20c #27bcd, 31, 34a, 35, 39bdf, 40bdf, 41b, 42a, 43
25		*Area Concepts*	Packet	1, 2ace, 3ae, 4, 6a, 8, 10
26		*Area and Perimeter*	Packet	1, 3, 5, 8, 10
27		*Parallelograms and Triangles*	Packet	1, 2, 4ace, 5ab, 7
28	24.1	*Area and surface area*	p. 583	5ab, 6bdfh, 7b, 9bd, 11bd, 12bdfhj, 13a, 14a, 15a, 16, 21a, 28d
29		*Surface Area I/II*	p. 583	1, 2, 3 #5c, 9ac, 12bdfhj, 13b, 14b, 17, 19ab, 26, 28abce
30		*Volume*	Packet	1, 2a, 3, 4, 7, 8, 10, 11, 12
31	24.2	*Volume*	p. 591	1bdfjl, 2bd, 3bdf, 4ac, 6, 7bd, 8bc, 9b, 10bd, 12, 14b, 17, 19bdfhjl, 20bd
32	24.3 & 25.1	*Issues for learning: measurement of area and volume*	p. 597 & 605	p. 597: 1, 2 p. 605: 2bd, 3, 4b, 5, 6, 8b, 9bce, 14, 16ab, 17, 18bdfh

Exam 3: Tuesday, November 19, 2019 from 8:00-9:00pm in PHYS 114.				
33		*Circles*	Packet p. 605	1, 2, 3, 4 p. 605 #2c, 10, 18f
34	25.1	*Circumference, area, and surface area formulas*	p. 607	18ijkl, 19b, 21acfg, 23ab, 24b, 25bd, 26, 29, 35, 37(let r = 10, 13)
35	26.2	*Some other kinds of measurement*	p. 635	4bc, 9, 10ac, 11, 12, 13ab, 16ab, 18a, 20, 23bde, 27b

Syllabus is subject to change with notification from the instructor.