Math 13900 Mathematics for Elementary Education III Spring 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.

I. Learning Objectives:

1. Differentiate between various polygons based on number of sides and measures of angles.
2. Find the sum of the measures of the interior angles of a polygon.
3. Draw nets for polyhedra.
4. Differentiate between various types of polyhedra including all regular polyhedra.
5. Determine number of lines of symmetry for a plane figure and orders of rotational symmetry.
6. Determine number of planes of symmetry for a solid figure as well as axes of rotational symmetry.
7. Recognize and draw shapes that tessellate the plane and solid figures that tessellate space.
8. Determine dimensions of similar planar figures.
9. Determine surface area and volume of similar solid figures.
10. Construct perpendicular bisectors and parallel lines using a compass and straightedge.
11. Recognize and draw rigid motions of shapes including translations, reflections and rotations.
12. Determine area of plane figures and surface area and volume of solid figures.
13. Use the Pythagorean Theorem to determine diagonals of solid figures.

II. Textbook:

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 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.

I. Grading: Grades consists 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 the web page. 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
98 – 100	A+
90 – 97%	A

%	Grade
80 – 89	B
70 – 79	C

%	Grade
60 – 69	D
Below 60	F

A minimum of 360 points is required to earn a D or better in the course.

- **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:** Quizzes 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: Monday, February 4, 2019 from 6:30-7:30pm in MA 175**
  - **Exam 2: Wednesday, March 6, 2019 from 6:30-7:30pm in MA 175**
  - **Exam 3: Wednesday, April 10, 2019 from 6:30-7:30pm in MA 175**
  - 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.

Link to video description: https://www.purdue.edu/provost/teachinglearning/honor-pledge.html

- **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.

II. Logistical Information

- **Attendance:** 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 accounted for.
- **Cell Phone Use:** Checking for messages and sending text messages is not appropriate during class time. Be polite and leave your cell phone alone during these 50 minutes.
- **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:** Friday, March 8, 2019 at 5:00pm

III. 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 for the current semester and discuss your accommodations as soon as possible.

MA 13900 Calendar Spring 2019

	Monday	Tuesday	Wednesday	Thursday	Friday
Week 1 01/07-01/11	Lesson 1		Lesson 2		Lesson 3
Week 2 01/14-01/18	Lesson 4		Lesson 5		Lesson 6
Week 3 01/21-01/25	No Class – MLK Day		Lesson 7		Lesson 8
Week 4 01/28-02/01	Lesson 9		Lesson 10		Lesson 11
Week 5 02/04-02/8	Review Exam I		Lesson 12		No Class
Week 6 02/11-02/15	Lesson 13		Lesson 14		Lesson 15
Week 7 02/18-02/22	Lesson 16		Lesson 17		Lesson 18
Week 8 02/25-03/01	Lesson 19		Lesson 20		No Class (IMERS)
Week 9 03/04-03/8	Lesson 21		Review Exam II		No Class
Week 10 03/11-03/15	Spring Break No Classes				
Week 11 03/18-03/22	Lesson 22		Lesson 23		Lesson 24
Week 12 03/25-03/29	Lesson 25		Lesson 26		No Class
Week 13 04/01-04/05	Lesson 27		Lesson 28		Lesson 29
Week 14 04/8-04/12	Lesson 30		Review Exam III		No Class
Week 15 04/15-04/19	Lesson 31		Lesson 32		Lesson 33
Week 16 04/22-04/26	Lesson 34		Lesson 35		Review
Final Exam Week 04/29-05/03					

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Math 13900 **Assignment Sheet** **Spring 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 (you can use the 24 blocks we used in class or the 30 from the packet), 3, 4
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
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
▪ **Exam 1: Monday, February 4, 2019 from 6:30-7:30pm in MA 175**				
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
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	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

17	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*
18	17.4	*Congruent polyhedra*	p. 446	1(Use isometric dot paper; Shade 2 cubes to right in I and 2 cubes on top in II), 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.)
19	18.1	*Symmetry of shapes in a plane*	p. 457	1, 4bdf, 5bde, 6, 7bd, 8bde, 11, 12 *Bring kit for lesson 20.*
20	22.6 & 23.1	*Issues for learning: Promoting visualization in the curriculum*	p. 549 & 555	p. 515: 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. 521: 1bdfhj, 2bdfhj, 4bcfhjln, 5bdf, 6b, 8bcd, 9efgh, 10
21	23.1	*Key ideas of measurement*	p. 556	12(no exp), 13, 14acd, 15, 16bdfh, 17bd, 18bd, 19, 22bdf, 23, 25
▪ **Exam 2: Wednesday, March 6, 2019 from 6:30-7:30pm in MA 175**				
22	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
23	23.2	*Length and angle size*	p. 564	24, 25bdf, 26defg, 27bcd, 31, 34a, 35, 39bdf, 40bdf, 41b, 42a, 43
24		*Area and Perimeter*	Packet	1, 3, 5, 8, 10
25		*Area Concepts*	Packet	1, 2ace, 3ae, 4, 6a, 8, 10
26		*Parallelograms and Triangles*	Packet	1, 2, 4ace, 5ab, 7
27	24.1	*Area and surface area*	p. 583	5ab, 6bdfh, 7b, 9bd, 11bd, 12bdfhj, 13b, 14b, 15a, 16, 17, 21a, 26, 28d
28		*Surface Area I/II*	p. 583	1, 2, 3 #5c, 9ac, 12bdfhj, 13b, 14b, 17, 19ab, 26, 28abce
29		*Volume*	Packet	1, 1a, 3, 4, 7, 8, 10, 11, 12
30	24.2	*Volume*	p. 591	1bdfjl, 2bd, 3bdf, 4ac, 6, 7bd, 8bc, 9b, 10bd, 12, 14b, 17, 19bdfhjl, 21bd
▪ **Exam 3: Wednesday, April 10, 2019 from 6:30-7:30pm in MA 175**				
31	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
32		*Circles*	Packet	1, 2, 3, 4

33	25.1	*Circumference, area, and surface area formulas*	p. 607	18ijkl, 19b, 21acfg, 23ab, 24b, 25bd, 26, 29, 35, 37(let r = 10, 13)
34	26.2	*Some other kinds of measurement*	p. 635	4bc, 9, 10ac, 11, 12, 13ab, 16ab, 18a, 20, 23bde, 27b
35		*GLOBE/NASA Lesson*		Reflection

Syllabus is subject to change with notification from the instructor.