

**Math 117**  
**Noyes Lab 217, Tuesday (3-4:40pm)**  
**Elementary Mathematics**

Instructor: Sue Purkayastha  
Office: 121 Altgeld Hall (AH)

E-mail address: [purkayas@uiuc.edu](mailto:purkayas@uiuc.edu)  
Phone: 265-5514 (O); 398-6742 (H)

Webpage: <http://www.math.uiuc.edu/~purkayas/math117>

Lab Sections

Section **AB1**: 1-2:40pm W, 14 Illini Hall  
Maya Saran  
E-mail: [msaran@uiuc.edu](mailto:msaran@uiuc.edu)

Lab Sections

Section **AB3**: 3-4:40pm W, 14 Illini Hall  
Maya Saran  
E-mail: [msaran@uiuc.edu](mailto:msaran@uiuc.edu)

Section **AB2**: 11-12:40pm R, 14 Illini Hall  
Warren Buck  
E-mail: [wbuck@uiuc.edu](mailto:wbuck@uiuc.edu)

Section **AB4**: 11-12:40pm W, 14 Illini Hall  
Warren Buck  
E-mail: [wbuck@uiuc.edu](mailto:wbuck@uiuc.edu)

**INTENT and PURPOSES of Mathematics 117**

From UIUC Course Catalog: "Analyses the mathematical issues and methodology underlying elementary mathematics in grades 6-8. Topics include the Real number system and field axioms, sequences and series, functions and math modeling with technology, Euclidean and non-Euclidean geometry, probability, and statistics. Priority registration will be given to students enrolled in teacher education programs leading to certification in elementary education."

**Goals:**

- To understand the mathematical ideas needed to provide a solid foundation for middle school students.
- To understand how the mathematical ideas connect to the "real world" and to other areas of study along with the support of various technology.
- To learn about the pedagogical structures that teachers can use to teach the math to middle school students of different learning styles.
- To understand how to assess students in a mathematics classroom. Also, to understand the state and national assessment standards.
- To gain proficiency in mathematical concepts that are apart of the middle and high school math curriculum.

**Objectives:**

- To create and maintain a notebook containing topic information, materials, activities, and worksheets aligned with the Illinois State Learning Standards.
- Become familiar with the State Learning Standards and the National Standards through activities and discussions.
- **Attend and actively participate in all labs and attend all lectures.**
- Learn the approaches to solving problems and apply this to middle school math instruction.

### **Required Materials:**

**Mathematics for Elementary School Teachers**, by Bennett and Nelson. 7<sup>th</sup> edition. 2006. ( note: the text is required in both Math 103 and Math 117).

**Learning Mathematics in Elementary and Middle Schools**, Cathcart, et.al, 4<sup>th</sup> edition. 2006

**Calculator:** TI-83 Plus or TI-84. Please do not bring TI-89 calculators and above. These will be difficult to use in this course.

**Upclose Packet:** will be available in the T.I.S. bookstore later.

**3-ring binder:** 2 or 3 inch, and **dividers for binder metric/English Ruler**

**compass:** Safe-T compass will be available in the bookstore for you to purchase

**graph paper**

**scissors**

### **GRADING POLICY**

Your final course grade is weighted using the following measures.

- 7.5% Attendance (3.75% lab and 3.75% lecture)
- 20% Unit Test 1
- 20% Unit Test 2
- 5% Notebook
- 10% Papers (*paper 1 = 5%, paper 2 = 5%*)
- 7.5% Lab participation
- 5% Homework
- 25% Final Exam

The following scale will be used to determine final letter grades. Please note that these are firm cut-offs for determining final grades. No rounding will occur in borderline situations -- for example, a 70 is the lowest C; a percentage of 69.9 is a D+. (Note that the .9 is not .9 repeating):

|                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|
| A+ = 98.0 – 100+ | B+ = 88.0 - 89.9 | C+ = 78.0 - 79.9 | D+ = 68.0 - 69.9 |
| A = 93.0 - 97.9  | B = 83.0 - 87.9  | C = 73.0 - 77.9  | D = 63.0 - 67.9  |
| A- = 90.0 - 92.9 | B- = 80.0 - 82.9 | C- = 70.0 - 72.9 | D- = 60.0 - 62.9 |

F = below 60

## ATTENDANCE

**REQUIRED** in both lecture and lab and constitutes 7.5% of your final grade.

LECTURE (1 point/lecture)

Perfect attendance = 14 points

LAB (1 point/lab)

Perfect attendance = 14 points

You are required to attend each lecture and each lab. You are allowed to have two excused absences. An absence is excused when the student has shown a doctor's note, an emergency dean's note, or has provided some viable written proof of absence to Mrs. Purkayastha. Sending an email to Mrs. Purkayastha does not automatically excuse an absence. Telling your lab instructor (TA) is not enough to excuse your absence. You must provide this written proof by the next lecture or lab meeting, depending which one you missed. All other absences are unexcused and there is no credit given for any missed work in the lab and homework must still be turned in on time. **An unexcused absence results in a zero for that missed class. I will emphasize that more than 2 absence zeroes, in both lab and lecture together, results in no attendance credit toward the course grade.** So, if you have a zero in lab and a zero in lecture, then one more zero in either class will result in a zero attendance grade. You will sign in at each lecture and there will be a participation quiz at the end of some lectures.

In the event that you miss a **TEST** for a valid and verifiable reason, the instructor (Sue Purkayastha) must be notified **in advance** by a phone call to my office or in writing by email. Failure to notify me **in advance** constitutes acceptance of a **zero** for that test. In the event that approval is given for you to make up a test, you must make an appointment to do the make-up within 24 hours from the time it is held. You must plan to take the make up within 3 days of making the appointment. Any exception to the 3-day time limit must be cleared in person or speaking to **me** directly. Only in rare cases will you be allowed more than one make-up. Make-up tests will be different from the original test. Each unit test constitutes 20% of your course grade.

## NOTEBOOK

You will compile a math resource notebook for middle school grades 5 - 8 that will be useful when you begin teaching. Organize your notebook into topics, i.e., geometry, functions, etc., to follow topics from each unit, or you may choose to organize into grade levels, or any other scheme you feel would be useful to you as a teacher. Use section dividers clearly labeled. When you are given papers for your notebook, put them in an appropriate section. Put a table of contents in the front of the notebook. You may choose to insert your class notes into the sections, but not required. Put a cover/title on the notebook that identifies it as a math resource made by you. Your notebook will be evaluated on or before the Final Exam and graded for organization and completeness, and constitutes 5% of the course grade.

## **PAPERS**

You will be required to write two papers during the semester. Each paper constitutes 5% of the course grade. The papers will be evaluated by your lab instructor and/or myself, must meet a required format, and your source must be cited. Failure to cite a source will result in an F grade in the course. This goes for papers that are obviously copied from other students as well. In lecture, you will be given specific requirements for each paper. Checklists for each paper will be provided. Please note the due dates for each paper in the course syllabus.

### **Paper #1:**

**Function Paper** (5% of course grade)

Required topic: Get a picture or drawing and determine the specific functions that constitute the picture.

### **Paper #2:**

**TBA... This will be an exploration and paper based on ideas from the geometry unit.**

## **LAB PARTICIPATION**

You will be participating in a laboratory section as a requirement for this course. You are required to attend all labs. The labs are designed with a cooperative learning theme. You will be working in groups, **actively participating, helping each other to understand the material.** The labs will involve active participation in mathematical explorations using manipulative tools and technology. You will learn about the ways in which we can help middle school students build skills that allow them to have a meaningful and often visual understanding of math concepts. You may find that you will need to “think outside a box” and thus become better math instructors for your students. The lab topics will usually follow from a topic discussed in the lecture that week. The structure of the lab involves homework checks/review/quizzes, lab activities, and lab reports. You are required to remain in lab the entire scheduled time. This is worth 5 % of your grade.

## **HOMEWORK**

Homework will be assigned each week to go with the material from the lecture. This will be assigned from the Bennett and Nelson textbook or from worksheets given in lecture. The textbook assignments will entail many of the even and some odd numbered problems. You may purchase the solution manual for the text. This optional book tends to provide the odd numbered solutions. It can serve as a guide to help you solve the assigned problems. Your lab instructor will answer questions on the homework. You may also seek help during office hours with me or with your lab instructor.

The homework will be checked in each lab section and is worth 5 points each. Each assignment will be due the week after that lecture (e.g., this week’s homework will be due in next week’s lab). Dates are provided on the syllabus.

Sometimes there will be problems that we may not have gone over in lecture. These problems may depend on the reading material, notes taken in class, or handouts. It is your responsibility to complete these or seek help when needed. The lab instructors will design and give some quizzes as a way to check your understanding. They will also collect the homework and grade for accuracy as they see the need to do so. It is imperative that the homework is taken seriously and completed to the best of your ability. **Simply submitting work that is either incomplete or inaccurate will lead to reduction in homework credit. It is the instructor's decision as to how they conduct the quiz/homework review.** Late homework will not be accepted. Homework is 7.5% of the grade.

### **Miscellaneous**

**EXTRA CREDIT:** A maximum of 1% toward the overall course grade can be earned by extra credit. The intent of extra credit is to allow you the chance to get your grade above a borderline grade. Because extra credit is available, course grades are **not** rounded up. Details will be provided later.

**FINAL EXAM:** The Math Dept. requires a final exam in this course. Conflict Exams must be approved by the Assoc. Chair of the Math Dept., Dr. Muncaster. The final exam constitutes 25% of the course grade.

**ACADEMIC INTEGRITY:** This course adheres strictly to the University's policy on Academic Integrity, Code of Policies and Regulations Applying to All Students, Section 33. If you are caught cheating, you will fail the class and a note describing the incident will be placed in your file.

**JAMES SCHOLAR:** You will be required to observe a math class in a middle school, and write an observation report. Please send me email to set up a meeting with me.

**PLEASE UNDERSTAND THAT ALL CELL PHONES AND ELECTRONIC DEVICES MUST BE TURNED OFF. THESE INCLUDE CELL PHONES, EARPHONES, BEEPERS, ETC. YOU WILL NOT BE ALLOWED TO USE CELL PHONES AS CALCULATORS.**

**THANK YOU.**

**MATH 117 COURSE SYLLABUS:** This course syllabus **does not** allow time to discuss the homework problems at each class meeting. You are encouraged NOT to rely on in-class discussion of these problems, but instead, to work with a partner or group, attend ALL LABS and to take advantage of our office hours. We want to meet with you and work one-to-one if this will benefit you. *If our hours conflict with other classes for you, consult with us about meeting with us at other times.* It is your responsibility to attend all classes to make sure that you are informed of any changes in this syllabus

### UNIT 1

(Unless otherwise written, the homework is from the Bennett and Nelson textbook)

**August 28, 2007 Lecture #1: Course Info, Problem Solving & Polya, Sets and Venn Diagrams**

- \* Read course syllabus; check out course website
  - \* Read sections 1-1, 1-3 in the Bennett text
  - \* Read pp 40-51 in the Cathcart text
- Lab #1: Problem-Solving in groups, no homework check

**September 4, 2007 Lecture #2: Patterns, Functions, Sequences and Series, and Reasoning**

- \* Read sections 1-2, 1-4, 2-1, 2-2, 2-3 in the Bennett text
- Lab #2: Attribute Blocks  
homework check on homework set #1

**September 11, 2007 Lecture #3: Linear Functions, finite differences**

- \* notes given in class, examples in Upclose Packet
- Lab #3: introduction to TI-83/84, Calculator problems, worksheet  
homework check on homework set #2

**September 18, 2007 Lecture #4: Quadratic Functions, Finite Differences**

- \* notes given in class, examples in Upclose packet
  - \* Read pp 407-413 in the Cathcart text
- Lab #4: CBL #1 "Pennies"  
homework check on homework set #3

**September 25, 2007 Lecture #5: Exponential Functions**

- \* Notes given in class, examples in Upclose packet
- Lab #5: CBL #2 "Chill Out"  
homework check on homework set #4

**October 2, 2007 Lecture #6: Inverse and Direct Variation Models,**

- \* Notes given in class, examples in packet
- Lab #6: CBL #3 "Function Walk"  
homework check on homework set #5

**October 9, 2007 Lecture # 7 : Unit 1 Exam**

- Please bring your calculator and seat yourselves in every other seat.  
Lab #7: Finding the equation of a necklace; Homework check 6

## UNIT 2

### **October 16, 2007 Lecture #8: Introduction to Geometry, Axiomatic systems, Area, Perimeter**

- \* Read sections 9-1, 9-2, 9-3, p414-419 in the Bennett text
  - \* Read pp 290-302 in Cathcart text
- Lab #8: Geoboards & dot paper; no homework check

October 23, 2007 Lecture #9: Geometry Constructions  
Lab #9: Geo Sketchpad Lab  
homework check on hw set #7

October 30, 2007 Lecture #10: , Volumes, Surface Area  
\* Read sections 10-2, 10-3 in the Bennett text  
\* Read pp 330-340 in the Cathcart text  
Lab #5: Volumes Lab; homework check on homework set #8

November 6, 2007 Lecture #11: Coordinate Geometry, Congruence, Similarity  
\* Read Chapter 11 in the Bennett Text  
Lab #11: Taxicab Geometry Lab; homework check on homework set #9

November 13, 2007 **Unit 2 Exam**  
**Please seat yourself in every other seat. Bring your calculator.**  
Lab #12: Spherical Geometry Lab  
homework check on homework set #10

November 20, 2007 Thanksgiving Break- no class

## UNIT 3

November 27, 2007 Lecture #13; Probability; Binomial Experiments  
\* Read chapter 8 in the Bennett text  
\* Read pp 369-275 in the Cathcart text  
Lab #12: using the TI-83 to simulate probability distributions  
no homework check

December 4, 2007 Lecture #14: Metrics, Exact vs. Approx., Precision; Algebraic Thinking

Course Evaluation

- \* Read the Bennett text

Lab #13: Metric Lab; homework check on homework set #12

**Project 2 due on Friday, December 7 3:00pm.**

**Final Exam**

**Saturday December 15, 2007, 7pm-10pm, Room : TBA**

- Homework set #1: p 13 # 2,3,7,8,10,13,15,16,18,23,26,30  
 p 30 # 5abc,6a, 8, 10, 15, 18, 26, 28  
 p 49 #10abcd, 14, 16
  
- Homework set #2: p 32 #22, 28, 30, 31  
 p 73 #15ab, 16ab, 17abc, 19  
 p 116 # 3abcd,5,8,10,12,13,15,18,20  
 sequences worksheet
  
- Homework set #3: Calculator problems worksheet  
 p 33 # 26, 27, 33ab, 34ab
  
- Homework set #4: Quadratic Modeling Problems, Calculator problems,  
 worksheet
  
- Homework set #5: Exponential Modeling problems worksheet
  
- Homework set #6: inverse and direct variation problems worksheet
  
- Homework set #7: p 579 # 5abc,7abc,9abc,10abc,14,18,28  
 p 595 # 2ab,5ab,6abc,10,11,14  
 p 615 # 2abc, 4abc, 9abc, 10abc, 11, 12abc, 16abc, 25a, 34a