

COORDINATOR: Mrs. Barbara Barone (bbarone@hunter.cuny.edu)

PREREQUISITES FOR THIS COURSE: This course is for early childhood, elementary education majors and pre-QUEST students. It is either the only course or the first of two courses in mathematics for teachers, depending on your grade level. **If you are not in these programs, you may not take this course.** You must have passed or exempted MATH 101 to take this course.

COURSE DESCRIPTION: This course is going to be different from every other math course you have ever taken because instead of trying to see “whether you know *how* to do it”, we will be discovering if you know “*why* you do it that way”.

MODE OF INSTRUCTION: This is an in-person class which will consist of lectures, demonstrations, and activities.

OFFICE HOURS: *View office hours as review sessions on particular topics on which you need assistance.* This is a personalized way to get individualized assistance.

REQUIRED TEXTS: *(are used for both MATH 104 AND MATH 105)*

A Problem Solving Approach to Elementary Mathematics for Elementary School Teachers, 13th edition, by Billstein, Libeskind, Boschmanns and Lott . You will find that it is considerably cheaper to buy the textbook as a loose-leaf version.

Mathematics Activities for Elementary School Teachers: A Problem Solving Approach by 13th edition, by Dolan, Williamson, Muri ***Make sure that your book has the pouch in the back with the cardboard manipulatives.***

Math Study Skills Workbook 5th edition by Paul Nolting

It is expected that you will read the section in the textbook BEFORE each class so that you may participate.

STRONGLY RECOMMENDED TEXT (see why below): Student’s Solution Manual (also available at the online Bookstore)

ADDITIONAL INFORMATION ABOUT THE TEXTBOOK: The questions in the A section have totally worked out answers in the solutions manual. At the end of each ***section*** there is a set of review problems. At the end of each ***chapter*** there is a chapter outline and comprehensive chapter review.

HOMEWORK: Homework is assigned for each section. Questions from Section A exercises in the textbook have answers in the back of the book and solutions in the solutions manual. Make sure you do ALL of these questions and ask the tutors for assistance as needed. Also consider forming a study group in the Dolciani Center to work on the homework together. **There will be periodic quizzes on the homework questions counting 10%.**

TESTS: There will be four tests given outside of class time counting 50% towards your grade. There are **no** make-ups. There will be a comprehensive final exam counting 20% during finals week.

STUDY SKILLS: Readings and assignments from Math Study Skills Workbook will be assigned throughout the beginning of the semester and will count 5% towards your grade.

PROJECTS: There are several major projects in this class counting a total of 10% of your grade. See the project handout for further details.

CLASS PARTICIPATION: Participation and communication is crucial and will account for 5% of your grade. Periodically, portions of the material covered in class will not be from the textbook. Do not rely on someone else for their notes – what is important to you may not be important to them.

CALCULATOR: Most elementary school children use the TI-15 calculator. We will be doing some demonstrations using them. You are also allowed to use them on exams. The calculator is roughly \$15 if you need to purchase one.

OUTLINE FOR CLASS/TESTS: The outline for each class tells you what you will need for each class, the homework assigned, the supplemental videos, the reading to be done in advance and reminders about projects due. This is a critical piece of information – make sure you constantly refer to it.

DOLCIANI MATHEMATICS LEARNING CENTER/CLASS HELP: The Dolciani Mathematics Learning Center, running virtually and onsite, has computer assisted instruction for most topics in this course as well as the knowledge this is assumed upon entry. It also has tutoring available. The hours will be announced during the first week of classes.

HUNTER COLLEGE POLICY ON ACADEMIC INTEGRITY: Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The college is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

ADA POLICY: In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, located in Room E1214B, to secure necessary academic accommodations. For further information and assistance, please call: (212) 772- 4857 or (212) 650-3230.

HUNTER COLLEGE POLICY ON SEXUAL MISCONDUCT: In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444).

b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the college's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

LEARNING OUTCOMES FOR THIS COURSE (approved by NCATE)

At the conclusion of this course, you should be able to:

1. Discuss Nolting's research on study skills as written in Math Study Skills Workbook.
2. Explain and illustrate the process standards and content standards developed by NCTM.
3. Explain and illustrate the Common Core Standards for Mathematics.
4. Interpret research on mathematics discussed in class and in the textbook.
5. Identify famous mathematicians/math educators discussed or read about to date.
6. Explain, illustrate and use Polya's 4-step problem solving process.
7. Explain, illustrate and apply the problem-solving strategies.
8. Identify sequences as arithmetic, geometric or neither and where appropriate, find the common differences and the n^{th} term.
9. Use successive differences to find a given term.
10. Develop the Fibonacci sequence and be able to draw, explain and work with figurate numbers.
11. Explain the advantages and disadvantages of the different numeration systems discussed.
12. Write any Roman numeral and write Egyptian, Babylonian and Mayan numerals to 500.
13. Know the various properties of each numeration system discussed.
14. Convert numbers from base ten to base x and vice versa.
15. Describe the concept of a set, use set notation, and perform operations on sets.
16. Interpret and draw Venn Diagrams.
17. Explain the differences between number and numeral and the research on how children learn the concepts;
18. Explain the conceptual difference between the basic operations;
19. Represent the four operations on whole numbers using concrete models;
20. Justify and apply the properties of addition, subtraction, multiplication and division of whole numbers;
21. Perform addition and subtraction in different bases;
22. Write verbal problems, using the Usiskin models, for the four different operations;
23. Identify and explain the various types of mental arithmetic and estimation;
24. Verify the theorems for divisibility discussed in class and in your textbook;
25. Explain and use the divisibility rules for 2, 3, 4, 5, 6, 8, 9, 10 and 11;
26. Develop divisibility rules for other factors, i.e. divisibility by 12, 18, etc.
27. Determine whether a number is prime,
28. Find the prime factorization of a number;
29. Illustrate the Fundamental Theorem of Arithmetic;
30. Find the number of whole-number divisors of a given integer and determine how far one must check before we can conclude a number is prime.
31. Find the GCD and LCM of two or more numbers using all methods discussed.
32. Identify and perform all the algorithms for addition, subtraction, multiplication and division of integers;
33. Identify and explain the various properties on operations of integers;
34. Represent the four operations on integers using concrete models.
35. Determine whether two fractions or decimals are equivalent or how one compares to another;
36. Use concrete models to illustrate the concepts of rational numbers and operations of rational numbers;
37. Use and justify the algorithms for rational numbers,
38. Use and justify the rules for exponents.
39. Determine if two ratios are equivalent.
40. Solve applications involving ratios and proportions.
41. Use and justify the algorithms for decimals.
42. Justify and perform the conversion of fractions to decimals.

43. Convert between fractions, decimals, and percents.
44. Solve applications involving percents.
45. Work with virtual manipulatives and hands-on manipulatives including but not limited to Cuisenaire rods, attribute blocks, base ten blocks, multi-base blocks, fraction calculators, pattern blocks, tangrams, dominoes.

HOW TO BE SUCCESSFUL IN THIS COURSE: Unlike other courses, reading the textbook *after* class will not work. You will need to read the section *before* you come to class so that you have some knowledge of the process and can share in the ideas presented and discussed in class. You are not expected to understand everything when you read it through in advance but this will give you an overview of the content so that classtime will clarify the concepts that you read. There are several other ways that you can be successful in this course:

- (a) ask questions – there is no such thing as a silly question and frankly, five other people probably have the same question and are waiting for you to ask it;
- (b) go to the tutoring sessions sponsored by the Dolciani Math Learning Center – the tutors who are there have taken this course in the past and know the types of questions and problems you will encounter;
- (c) use the computer tutorials;
- (d) do all homework assignments and never skip a homework question;
- (e) find a study buddy in class that you can contact if you have questions – exchange a phone number or e-mail address with someone today;
- (f) consider forming a study group in the Dolciani Math Center where you can work together with other students;
- (g) don't miss any classes – the notes and concepts that are important to you might not be as important to someone else;
- (h) stay on schedule with the readings – this class moves at a relatively quick pace – getting behind a day or two may be too much to catch up on over the weekend;
- (i) use the solutions manual – it has worked out solutions for most questions assigned
- j) work on the "Now You Try It" sections as you go through the readings – this will tell you whether you understand what you are reading (the answers are in the back of the textbook);
- (k) do not ignore the "why's" just because you know how to do the calculations; the emphasis is on these "*why's*" and not so much on the "*how's*";
- (l) take all exams – missed test = 0 – surely there will be something on the test that you will know - don't ever be embarrassed;
- (m) do the review exercises at the end of each section beginning with section 1.2 – they will help keep past information current in your mind;

...and most of all, ***participate, participate, participate***,even if you are not sure if you are correct....you and I will never know whether you understand the material or if I am making any sense if you just sit there and be a passive listener instead of an active learner!