MATH 105

<u>COORDINATOR</u>: Mrs. Barbara Barone (bbarone@hunter.cuny.edu)

<u>PREREQUISITES FOR THIS COURSE</u> This course is for elementary education majors and pre-QUEST students. It is the second of two courses in mathematics for childhood education teachers. **<u>If you are not</u> <u>in these programs, you may not take this course.</u>** You must have passed MATH 104 with a grade of C or better to take this course.

<u>COURSE DESCRIPTION</u>: 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".

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

REQUIRED TEXTS:

<u>A Problem Solving Approach to Elementary Mathematics for Elementary School Teachers</u>, **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. Do not assume that Amazon is the cheapest. *It is expected that you will read the section in the textbook BEFORE each class so that you may participate.*

<u>Mathematics Activities for Elementary School Teachers: A Problem Solving Approach</u> by **13th edition**, by Dolan, Williamson, Muri *Make sure that your book has the pouch in the back with the cardboard manipulatives.* Because this is a hands-on course using an electronic copy of the activity manual will not suffice (i.e. you can't cut out materials nor can you measure the length, area, etc)

<u>STRONGLY RECOMMENDED TEXT (see why below)</u>: Student's Solution Manual (available at the online Bookstore and can be used in the Center as well)

<u>ADDITIONAL INFORMATION ABOUT THE TEXTBOOK</u>: 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.

<u>ADDITIONAL MATERIALS NEEDED:</u> You will also need a protractor, a compass, and a ruler for this class.

<u>**TESTS:</u>** 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.</u>

HOMEWORK: Your homework is 15% of your grade allocated as indicated here. 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. These do **NOT** need to be handed in. 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 these homework questions counting 10%.** For each class you will also have a short math ed exercise that you will be required to turn in. **These will count 5% towards your homework grade.** You will be graded on your correctness as well as your thought process.

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

<u>**CLASS PARTICIPATION:</u>** Participation and communication is crucial. 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. Participation counts 5% of your grade.</u>

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

<u>HUNTER COLLEGE POLICY ON ACADEMIC INTEGRITY:</u> 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.

<u>HUNTER COLLEGE POLICY ON SEXUAL MISCONDUCT:</u> 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. <u>Sexual Violence:</u> 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. <u>All Other Forms of Sexual Misconduct</u>: 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. express a quantity in terms of algebraic notation.
- 2. solve equations with one variable.
- 3. solve verbal problems using equations.
- 4. represent functions.
- 5. use Fibonnaci sequence.
- find slopes and equations of lines and be able to identify the graphs of lines and recognize the shifts of y = mx;
- 7. distinguish between experimental and theoretical probability;
- 8. find probabilities of single and multi-stage events;
- 9. find geometric probabilities;
- 10. use Pascal's triangle to solve probability problems;
- 11. read and analyze statistical graphs and determine when it is better to use each;
- 12. find measures of central tendency, know the differences between each measure and determine when it is better to use each;
- 13. find measures of dispersion, know the differences between each measure and determine when it is better to use each;

- 14. use the normal curve to solve verbal problems including percentiles, quartiles, percentages of students within each standard deviation, etc. and interpret test information by using information on the normal curve, as well as percentiles, etc;
- 15. draw and analyze box plots;
- 16. identify general uses and abuses of statistical information;
- 17. be familiar with types of polygons and list properties of various types of each;
- 18. use paper folding and dot paper to demonstrate certain relationships in geometric figures;
- 19. identify and understand different types of curves;
- 20. find the measures of angles through direct and indirect reasoning;
- 21. find the measure of interior angles of a triangle and of convex polygons as well as the sum of the measures of these angles;
- 22. perform and justify various constructions using both a compass and technology and discuss the properties proven;
- 23. prove the theorems for congruence and similarity and determine whether two polygons are congruent and/or similar;
- 24. use and understand the concept of non-standard and standard measurement;
- 25. compare similarities and differences between the standard and metric systems of measurement;
- 26. convert within the standard and metric systems of measurement;
- 27. prove and apply the triangle inequality theorem;
- 28. determine whether points are collinear using coordinates;
- 29. solve problems using coordinate geometry;
- 30. convert between different scales of temperatures;
- 31. develop and apply the formulas for perimeter and circumference of figures;
- 32. develop and apply the formulas for arc length and arc sector;
- 33. develop and apply the formulas for area of polygons using geoboards and dot paper.
- 34. explain, use and apply the Pythagorean Theorem;
- 35. derive, use and apply the properties of special right triangles;
- 36. derive, use and apply the distance formula;
- 37. use the distance formula to develop the equation of a circle;
- 38. derive the formulas and find the surface area of any given solid and understand the interconnection between them;
- 39. derive the formulas and find the volume of any given solid and know the interconnection between them;
- 40. given points in a plane, use paper folding, dot paper, compass, and/or GeoGebra to work with translations, rotations, reflections and glide reflections;
- 41. work with line, rotational and point symmetry and identify lines of symmetry;
- 42. identify and use spinners, tangrams, compass, protractor, pentaminoes, geoboards, volume kits, MIRA, paper folding, dot paper, pattern blocks, computer technology (i.e. GeoGebra or Geometer's Sketchpad) and virtual manipulatives.

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 virtual/onsite 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 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 and will help you understand where your problems or strengths are;
- (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 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!