

QUEENSBOROUGH COMMUNITY COLLEGE
MATHEMATICS AND COMPUTER SCIENCE DEPARTMENT

COURSE OUTLINE

MA-303

NUMBER SYSTEMS

Pre-requisite: MA-120 or permission of the Department.

Hours: 3 Class Hours 1 Recitation Hour 3 Credits

Course Description:

This course is designed to instruct students in areas of mathematics that are related to the elementary school curriculum, to clear up common misunderstandings of mathematical concepts, and to use current computer technologies with the concepts developed in the course as tools for solving problems. Topics covered will be chosen from numeration systems, number theory, mathematical systems, statistics and geometry.

Recommended for future teachers.

Curricula for which the course is required/recommended:

A.S. Degree Programs in Liberal Arts and Sciences (Science and Mathematics), A.A. Degree in Liberal Arts and Sciences and Education.

General Education Objectives:

Use analytical reasoning skills to identify issues or problems and evaluate evidence in order to make informed decisions; reason quantitatively and mathematically as required in their fields of interest and in everyday life; integrate knowledge and skills in their program of study; use information management and technology skills effectively for academic research and lifelong learning.

Course Objectives/ Expected Student Learning Outcomes:

Further develop an adult-level perspective and insight into the nature and concepts of mathematics taught in elementary school; improve ability to engage in mathematical thinking and reasoning; use mathematical knowledge to solve problems; improve ability to communicate mathematically using a variety of Representations; gain appropriate mastery over the following topics: problem solving, sets, functions, Venn diagrams, deductive reasoning, inductive reasoning, numeration systems, four basic arithmetic operations, exponents, factors/multiples, greatest common divisors, least common multiples, integers, fractions, decimals, ratios, percents, scientific notation, irrational numbers, and real numbers.

Text: Mathematical Reasoning for Elementary Teachers, Fifth Edition,
by Calvin T. Long and Duane W. DeTemple,
Pearson/Addison Wesley, 2006.

Methods by which student learning will be evaluated:

The student's evaluation will be based upon the quality of written and oral presentations in the form of homework, group work, projects, field interviews or observations, tests and quizzes.

Student's evaluation will be based upon the following (subject to change):

- Tests: 20%
- Group Work/Projects: 30%
- Homework: 20%
- Field Interview/Observation: 20%
- Quizzes: 10%

Group work, projects, written and oral presentations, use of technology such as the graphing calculator, computer software and the internet supplemented by lecture will be the primary methods of instruction. *The student may also be required to observe and/or interview a person employed in their field of interest.*

Academic Integrity:

Academic honesty is taken extremely seriously and is expected of all students. All assignments must be the original work of the student (and partners or group, if applicable). All questions or concerns regarding ethical conduct should be brought to the course instructor. "It is the official policy of the College that all acts or attempted acts that are violations of academic integrity be reported to the Office of Student Affairs (OSA). At the faculty member's discretion and with the concurrence of the student or students involved, some cases, though reported to the OSA, may be resolved within the confines of the course and department. The instructor has the authority to adjust the offender's grades as deemed appropriate, including assigning an F to the assignment or exercise or, in more serious cases, an F to the student for the entire course." (Taken from the QCC Academic Integrity Policy, 2/14/2005.)

NOTE: Any student who feels that he/she may need an accommodation based upon the impact of a disability should contact the instructor privately to discuss his/her specific needs. Please contact the office of Services for Students with Disabilities in Science Building, room 132 (718 631 6257) to coordinate reasonable accommodations for students with documented disabilities.

<u>TOPICS</u>	<u>SECTIONS</u>	<u>HOURS</u>
Problem Solving: Pattern Exploration, Numerical Sequences, Problem Solving Principles and Strategies.	1.1-1.5	6
Sets and Whole Numbers: Set Notation and Operations, Properties of Whole Numbers.	2.1-2.4	3
Numeration Systems: Babylonian, Egyptian, Mayan, Roman, Indo-Arabic, Binary, Nondecimal Positional Systems, Algorithms for Add, Subt, Mult, and Division, Estimation.	3.1-3.6	9
Number Theory: Divisibility, Greatest Common Divisor and Least Common Multiples, Clock Arithmetic.	4.1-4.4, 5.4	6
Statistics: Statistical Graphs, Data Analysis, Measures of Central Tendency, Statistical Inference.	9.1-9.3	7
Geometry: Polygonal Curves, Three Dimensional Geometry, Networks.	11.1-11.4	8
Exams		3
	Total:	<hr/> 42

MA-303 COMPUTER LABORATORY SCHEDULE

SOFTWARE

Microsoft WORD

Microsoft EXCEL

The Geometer's Sketchpad

WEEK TOPIC

1. **Introduction to the Equation Editor in *WORD*.**
2. **Presenting solutions to mathematical problems using the Equation Editor.**
3. **Introduction to the *Internet* and various mathematics related websites. Using search engines to research topics in mathematics and mathematics education.**
4. **Project I, Part 1: Researching a topic in mathematics or mathematics education on the *Internet*.**
5. **Project I, Part 2: Completing the *Internet* research.**
6. **Introduction to spreadsheets in *EXCEL*.**
7. **Creating and editing spreadsheets in *EXCEL* using data from real world mathematics applications.**
- 8 & 9 **Using *EXCEL* to create tables and graphs of real world data.**
10. **Project II, Part 1: Statistical analysis and problem solving using *EXCEL* and *WORD*.**
11. **Project II, Part 2: Statistical analysis and problem solving using *EXCEL* and *WORD*.**
12. **Introduction to *The Geometer's Sketchpad*, a geometry utility program.**
13. **Using *The Geometer's Sketchpad* to discover characteristics of various polygonal curves.**
14. **Project III: Problem Solving using *The Geometer's Sketchpad*.**

The approximate hours per chapter are guidelines and are at the discretion of the instructor. The instructor is responsible for making assignments and scheduling examinations. The Final Exam date is scheduled by the Registrar.