SUFFOLK COUNTY COMMUNITY COLLEGE
COLLEGE-WIDE COURSE SYLLABUS
MAT102 (formerly MA22)

I. COURSE TITLE:

Survey of Contemporary Mathematical Topics

II. CATALOG DESCRIPTION:

Liberal arts mathematics course providing an appreciation of contemporary mathematics by examining nontraditional topics such as probability and statistics; theories of games, groups and numbers; and finite differences. Prerequisite: MAT007 or equivalent. Note: *Credit given for MAT102 or MAT108 but not both.*

A-E-G / 3 cr. hrs.

III. COURSE GOALS:

A. Expose students to contemporary developments in mathematics.
B. Discuss current applications of probability.
C. Discuss nontraditional topics in geometry.

IV. COURSE OBJECTIVES:

Upon successful completion of this course, students will be able to:

A. demonstrate an understanding of the use of factorials, combinations and permutations;
B. demonstrate an understanding of what is meant by probability and conditional probability;
C. compute P(A), P(A, given B), P(A and B) and P(A or B);
D. demonstrate a fundamental knowledge of axiomatic structures by comparing different geometric systems;
E. demonstrate a fundamental knowledge of number theory (congruence classes, prime numbers, perfect numbers, divisibility and sequences).

Depending on the instructor's choice of optional topics, students should be able to

F. solve two-dimensional linear programming problems graphically;
G. demonstrate a fundamental knowledge of statistics (frequency distributions and their graphs, averages and variability);
H. demonstrate a fundamental knowledge of matrices, their operations and uses;
I. demonstrate a fundamental knowledge of game theory, mathematical expectation and how to solve 2x2 games;
J. demonstrate a fundamental knowledge of finite groups and their applications;
K. find the general term of a mathematical sequence using finite differences or other methods;
L. use mathematical induction to prove series formulas.

V. Topics Outline with Timeline

Topics	Approximate Time (Including Examinations)
A. Probability Theory 1. definitions of probability of an event 2. rules and theorems of probability a. P(A and B) b. P(A or B) 3. conditional probabilities 4. counting problems a. permutations b. combinations	2-3 weeks
B. Number Theory 1. congruence classes 2. prime numbers 3. perfect numbers 4. divisibility and the Euclidean algorithm 5. sequences a. Fibonacci b. geometric c. others	2-3 weeks
C. Geometry 1. survey of Euclidean geometry 2. survey of Riemannian geometry 3. survey of Gaussian geometry 4. transformation geometry 5. Platonic figures and Euler's formula 6. map coloring 7. topological equivalences	3-4 weeks
Additional Topics: at least 2	
D. Linear Programming 1. graphing inequalities 2. types of linear programming problems 3. vertex theorem and the graphical solution	2-3 weeks
E. Statistics 1. frequency distributions 2. measures of central tendencies a. mean b. median c. mode 3. measure of variability - standard deviation 4. statistical graphs - how to interpret	2-3 weeks

5. samples - what do they mean?	
F. Matrices 1. definition and notation 2. operations 3. applications to systems of equations 4. applications - simple explosion problem	1 ½ weeks
G. Game Theory 1. mathematical expectation 2. definitions a. saddle point b. games c. strategies d. other 3. solution of 2x2 games 4. solution of 3x3 games	1 ½ weeks
H. Group Theory 1. definitions 2. properties 3. applications a. symmetric group b. congruence c. matrices	2-3 weeks
I. Finite Differences 1. to find the general term of sequences a. linear b. quadratic c. other 2. application to series 3. mathematical induction	2-3 weeks

VI. Evaluation of Student Performance:
To be determined by the instructor

VII. Programs that require this course:
Communications and Media Arts: Journalism/AA (recommended)

VIII. Courses that require this course as a prerequisite:
None

IX. Supporting Information:
Mathematics tutoring services, as well as video and computer aids, are provided for all students through the Math Learning Center (Ammerman Campus, Riverhead 235), the Center for Academic Excellence (Grant Campus, Health, Sports and Education Center 129), and the Academic Skills Center (Eastern Campus, Orient 213).