LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF MATHEMATICS, ENGINEERING AND COMPUTER SCIENCE

MAT107 — MATHEMATICS AND THE MODERN WORLD - HYBRID

3 credits, 2 hours in-class, 1 hour flexible
Prerequisite: CSE099, ENA/ENG/ESA099, MAT096

Catalog Description:

This course introduces selected topics in mathematics which have significant application in other fields. For each topic studied, emphasis will be placed first on the mathematics itself, and then on one or more significant applications of the mathematics. Topics to be included will be chosen from the areas of number theory, algebra, probability and statistics, topology, computers, and geometry.

Purposes and Goals: Upon completion of this course, the student should be able to:

1. Discuss the four steps of problem solving.
2. Discuss the differences between combinations and permutations.
3. Discuss deductive reasoning.
4. Discuss binary arithmetic.
5. Discuss the properties of numeration systems.
6. Discuss compound and simple interest.
7. Discuss operations with sets.

Instructional Objectives: The instructor is expected to:

1. Explain the four steps of problem solving.
2. Explain the differences between combinations and permutations.
3. Explain deductive reasoning.
4. Explain binary arithmetic.
5. Explain the properties of numeration systems.
6. Explain compound and simple interest.
7. Explain operations with sets.

Performance Objectives: During the course, students should learn how to:

1. Apply the four steps of problem solving.
2. Use combinations and permutations in applied problems.
3. Apply deductive reasoning.
4. Solve problems using binary arithmetic.
5. Apply the properties of numeration systems.
6. Use formulas for compound and simple interest.
7. Apply operations with sets.

Attendance:

Students are expected to attend all class meetings. Students are also responsible for demonstrating engagement in the web-based class activities that are an integral part of the course. Students are held responsible for all notes, announcements, and materials whether or not they have "attended" the class. Students should consult the college catalog to find out the terms and conditions under which a WU, an Incomplete, or an F grade may be given by the instructor.

Textbook:

Title: Thinking Mathematically (6^{th} edition)
Author: Robert Blitzer
Publisher: Pearson Prentice Hall
ISBN-10: 0321867327

Evaluation:

Quizzes and Mid-semester Exam	40%
Homework, Projects, and Web-Based activities	30%
Final Examination	30%

The final exam is administered during Final Exam week.

The following schedule may be modified by the instructor.

Topic(s)	Text Sections
Polya's Four-Step Method for Problem Solving Quantitative Modeling	1.3 and Class Notes
Weights and Measures	9.1 – 9.3
Algebraic Models	6.1 - 6.3, 7.1, 8.1
Network Models	14.1, 14.2, 14.4
Counting, Probabilities and Expected Values	11.1 – 11.4, 11.8
Decision Tree Models	Class Notes
Personal Finance	8.2 – 8.5
The Math of Computers	4.1 - 4.3, 3.1 - 3.4
Additional Topics	
Suggested Web-based Activities	
Income Taxing Schemes and Fairness	
Applications of Polya's Problem Solving Method	
Review of Sets and Set Operations	
Spreadsheets for Modeling and Computation	
Effective Communication with Charts and Graphs – Wealth Imbalance in the US	
The Use of Simulation Models for Experiential Learning	
Number Systems, Past and Present	
Additional Activities and Materials	