Proposed IAI Code M1 904

City Colleges of Chicago
Course Title: General Education Math
(IAI Code: M1 904 )

Length of course: 16 Weeks
Contact Hours: 4 Contact Hours
Credit Hours: 4 Credit Hours
Lecture Hours: 4 Lecture Hours
Lab Hours:
Weekly Plan: 4 Hours

Catalogue Description:
This course is designed to fulfill general education requirements. It is not designed as a prerequisite for any other college mathematics course. This course focuses on mathematical reasoning and the solving of real-life problems. Three topics are to be studied in depth from among the following list: counting techniques and probability, game theory, geometry, graph theory, linear programming, logic/set theory, mathematics of finance, and statistics. Mathematical modeling must be integrated in any combination of topics selected. Technology and writing assignments will be used throughout the course as appropriate. Applications involving problem-solving skills are emphasized throughout the course.

Students the Course is Expected to Serve:
This course is intended for students who are liberal arts majors and require only one general education mathematics course for their undergraduate degree.

Pre-requisites:
Prerequisite -- MATH 099 With a minimum grade of 'C' or Placement Test -- or Consent of Chair --

Course Objectives:
1. Interpret and draw inferences from mathematical models such as formulas, graphs, tables, and schematics.
2. Represent mathematical information symbolically, visually, numerically, and verbally.
3. Use arithmetic, algebraic, geometric, and/or statistical methods to solve problems.

Student Learning Outcomes:
Upon satisfactory completion of the course, students will be able to:
A. **Counting Techniques and Probability:** Apply the addition and multiplication rules of counting to a contextual situation.
B. Apply permutations and combinations to a contextual situation.
C. Determine and count the outcomes in an experiment.
D. Apply the addition and multiplication rules of probability.
E. Formulate and apply discrete probability distributions to a contextual situation.
F. Identify mutually-exclusive and independent events from contextual situations.
G. **Game Theory:** Apply the concepts of game theory to contextual situations.
H. Apply methods of linear programming and matrix algebra to solving a game.
I. Interpret the solution of a game.
J. **Geometry**: Apply formulas (i.e., perimeter, circumference, and area) for 2-dimensional figures to a contextual situation.

K. Apply formulas (i.e., volume, and surface area) for 3-dimensional figures to a contextual situation.

L. Apply the concepts of circles and spheres to a contextual (real-world) situation.

M. Apply the Pythagorean Theorem to a contextual situation.

N. Solve applications involving parallel and perpendicular lines.

O. Apply the concepts of congruence and similarity to a contextual situation.

P. **Graph Theory**: Translate appropriate contextual situations into the language of graph theory.

Q. Apply the techniques of graph theory to situations involving the creation of optimal networks.

R. **Linear Programming**: Formulate and solve a linear programming problem from various representations of contextual situations.

S. Interpret the solution of a linear programming problem.

T. **Logic/Set Theory**: Recognize the logical structure of an argument and determine its validity.

U. Illustrate relations between sets using Venn Diagrams.

V. **Statistics**: Construct and interpret frequency distribution tables and graphs.

W. Determine and interpret the measures of descriptive statistics (i.e., central tendency, dispersion, and position) in contextual situations.

X. Apply the properties of the normal distribution to contextual situations.

Y. **Mathematics of Finance**: Apply the concepts of simple and compound interest, future and present values, and the yield rate of investments to contextual situations.

Z. Apply the concepts of simple and compound interest, future and present values, and the yield rate of investments to contextual situations.

AA. *(It is expected that the following student learning outcomes (Mathematical Modeling) will be embedded as appropriate in the study of the topics listed above.)* Formulate a mathematical model from various sources of information.

BB. Select and apply appropriate models for solving real-world problems.

**Topical Outline:**
Due to the diversity in the way the General Education Mathematics course can be designed, there are many possible groupings of the topics. Some recommended groupings of the topics include:

**Group 1**: Finance, Geometry, and Statistics.

**Group 2**: Logic/Set Theory, Counting Techniques and Probability, and Game Theory.

**Group 3**: Logic/Set Theory, Counting Techniques and Probability, and Graph Theory.

**Group 4**: Linear Programming, Game Theory, and Graph Theory.

*Note: the topical outline will vary based on the grouping selected.*

**Calendar:**

**Methods of Evaluation:**

- **Total Percentage**: 0%
  - The weight given to exams, quizzes, and other instruments used for evaluation will be determined by the instructor.

**Methods of Assessment:**

- Exams, quizzes, homework, in-class activities and other assessments will be used as appropriate to assess student learning.
**Methods of Instruction:**
Problem-based activities, collaborative-learning techniques, and lecture will be used as appropriate.

**Recommended Text:**