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. <u>Applications involving problem-solving skills are emphasized throughout the course.</u>

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. <u>Counting Techniques and Probability:</u> 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. <u>Geometry:</u> 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. <u>**Graph Theory:**</u> 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. <u>Linear Programming:</u> 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. <u>Statistics:</u> 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. <u>Mathematics of Finance</u>: 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:

<u>Group1</u>: Finance, Geometry, and Statistics.

<u>Group2:</u> 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:

- 1. Miller, Heeren, and Hornsby Jr. *Mathematical Ideas* 10th Edition, Harper Collins Publishing Co., 2003 ISBN: 0-536-75279-6
- 2. Bello, Britton, & Kaul *Topics in Contemporary Mathematics* 2008 Edition, Houghton Mifflin, Co., 2008

Preparation Date: 01/15/2009

CID: 7101