HIGHLAND COMMUNITY COLLEGE

Syllabus

MAT 108 Contemporary Math
3 Credit Hours (Lecture)
Prerequisites: MAT 103 with a C or higher or Assessment
Revision Date: 04/08/2022

Department:

Mathematics

Course Description:

Contemporary Mathematics develops students critical and logical thinking skills in mathematics while applying generalizations, principles, theories, or rules to real world problems. Areas of focus are: estimation and number applications, statistics, probably and risk, financial and social issues applications. This course does not satisfy the graduation requirements for an Associate of Science degree.

Course Competencies:

The learning outcomes and competencies detailed in this syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups for this course as approved by the Kansas Board of Regents**.** (Kansas Regents Shared Number Course and Title: **KRSN MAT1040 Contemporary Math/Essential Math).**

Upon completion of the course, the student should be able to:

1. Apply critical and logical thinking skills to various applications.
2. Apply estimation and an understanding of numbers to various applications.
3. Apply generalizations, principles, theories, or rules to the real world with respect to different disciplines.
4. Use statistics for decision making.
5. Demonstrate basic concepts of probability and risk.
6. Apply mathematical tools to financial applications.
7. Apply mathematics to the study of social issues.

Course Content:

Problem Solving

1. Problem Solving
2. Inductive and Deductive Reasoning
3. Estimation

Set Theory

1. The Language of Sets
2. Comparing Sets
3. Set Operations
4. Survey Problems

Logic

1. Statements, Connectives, and Quantifiers
2. Truth Tables
3. The Conditional and Biconditional
4. Verifying Arguments
5. Using Euler Diagrams to Verify Syllogisms

Graph Theory

1. Graphs, Puzzles, and Map Coloring
2. The Traveling Salesperson Problem
3. Directed Graphs

Optional: Numeration Systems

1. The Evolution of Numeration Systems
2. Place Value Systems
3. Calculating in Other Bases
4. Looking Deeper: Modular Systems

Number Theory and the Real Number System

1. Number Theory
2. The Integers
3. The Rational Numbers
4. The Real Number System
5. Exponents and Scientific Notation

Algebraic Models

1. Linear Equations
2. Modeling with Linear Equations
3. Modeling with Quadratic Equations
4. Exponential Equations and Growth
5. Proportions and Variation
6. Modeling with Systems of Linear Equations and Inequalities

Consumer Mathematics

1. Percents, Taxes, and Inflation
2. Interest
3. Consumer Loans
4. Annuities
5. Amortized Loans

Optional: Geometry

1. Lines, Angles, and Circles
2. Polygons
3. Perimeter and Area
4. Volume and Surface Area
5. The Metric System and Dimensional Analysis
6. Geometric Symmetry and Tessellations

Apportionment

1. Understanding Apportionment
2. The Huntington-Hill Apportionment Principle
3. Other Paradoxes and Apportionment Methods

Voting

1. Voting Methods
2. Defects in Voting Methods
3. Weighted Voting Systems

Counting

1. Introduction to Counting Methods
2. The Fundamental Counting Principle
3. Permutations and Combinations

Probability

4. The Basics of Probability Theory
5. Complements and Unions of Events
6. Conditional Probability and Intersections of Events
7. Expected Value

Descriptive Statistics

1. Organizing and Visualizing Data
2. Measures of Central Tendency
3. Measures of Dispersion
4. The Normal Distribution

Learning Assessments:

Course competencies will be assessed by written examinations covering all course material, including regular hour-long exams and a required, comprehensive final exam. Additionally, assessment may also occur through any of the following at the discretion of the instructor: regular collection of homework, in-class work, quizzes, journals, and various projects.

Instructional Materials:

Textbook: Pirnot, T. & Moore, M. (2022). *Mathematics All Around* (7 th ed.). Boston, MA: Pearson Addison-Wesley. ISBN-13: 9780136965749

The textbook will be augmented with selected articles from newspapers and magazines to provide relevant examples of course material, where appropriate.

A TI-84 calculator is required for this course.

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the "Disabilities Self-Identification Form" on our Disability Services website.

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an online report about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our Equity Grievance Policy.