HIGHLAND COMMUNITY COLLEGE

Syllabus

MAT 108 Contemporary Math
3 Credit Hours (Lecture)
Prerequisites: MAT 103 with a C or higher or Assessment
Revision Date: 12/06/2019

Department:

Mathematics

Course Description:

This course is designed to develop problem-solving skills by studying a wide range of contemporary applications of mathematics and to develop an appreciation of what mathematics is and how it is used today. The main goal of the course is to introduce the power and variety of mathematical techniques that are available to an educated member of society. Some of the great ideas of mathematics and how they can be used in everyday life will be explored, including but not limited to: set theory, logic and syllogisms, graph theory, number theory, algebraic models, modeling systems for both linear equations and inequalities, voting methodology, consumer mathematics, and descriptive statistics. 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.
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.
8. Apply mathematics to applications across many different disciplines.
9. Apply Euler's theorem when tracing graphs.
10. Use Fleury's theorem to find Euler circuits.
11. Find Hamilton paths and circuits in graphs.
12. Solve the "traveling salesperson-type problem" using the brute force algorithm, the nearest neighbor algorithm, or the best edge algorithm.
13. Use the simple and compound interest formulas to find future value.
14. Determine the payment amounts for an add-on loan and compute the finance charges on a credit card using the "unpaid balance method."
15. Compare credit card finance charge methods and use the "average daily balance method" to compute credit card charges.
16. Use the formula for calculating the future value of an ordinary annuity.

Course Content:

A. Section 1.3 The Language of Sets

B. Section 1.4 Comparing Sets
C. Section 1.5 Set Operations
D. Section 1.6 Survey Problems
E. Section 2.6 Euler Diagrams / Verifying Syllogisms
F. Section 3.1 Graphs, Puzzles, Map Coloring
G. Section 3.2 Traveling Salesperson Problem
H. Section 5.1 Number Theory Around Us
I. Section 5.5 Exponents / Scientific Notation
J. Section 6.1 Linear Equations
K. Section 6.2 Modeling w/ Linear Equations
L. Section 6.3 Modeling w/ Quadratic Equations
M. Section 6.4 Exponential Equations and Growth
N. Section 6.5 Proportions and Variation
O. Section 6.6 Functions
P. Section 7.1 Systems of Linear Equations
Q. Section 10.1 Voting Methods
R. Section 11.1 Percent
S. Section 11.2 Interest
T. Section 11.3 Consumer Loans
U. Section 11.4 Annuities
V. Section 14.1 Organizing and Visualizing Data
W. Section 14.2 Measures of Central Tendency
X. Section 14.3 Measures of Dispersion
Y. Section 14.4 The Normal Distribution

Learning Assessments:

Course competencies will be assessed by written examinations covering all materials, including quizzes, written hour exams, and a comprehensive final exam. There will also be several projects, including a written report on the results of the Internet project chosen by the instructor. Some assessment may also occur through regular collection of homework and in-class work.

Instructional Materials:

Textbook: Pirnot, T. (2010). *Mathematics All Around* (4th ed.). Boston, MA: Pearson Addison-Wesley. ISBN-13: 978-0321567970

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

A scientific 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.