Course Title: Math for Liberal Arts   **Credit Hours**:   4 hours

Instructor: Gary S. Nonnemacher

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Office/Hours: 3:00 PM - 5:30 PM Monday - Thursday. Other times by appointment.

Catalog Description:

A survey course for students whose program of study has no further mathematics requirements. This course satisfies general education requirements, but is not the prerequisite for any other mathematics course. Topics covered include: financial mathematics, symbolic logic, probability and counting principles, voting and apportionment methods, and applications of vertex-edge graphs. The history, language, and usefulness of mathematics will be emphasized throughout the course. Students will be expected to use routine algorithms and engage in critical thinking.

Prerequisites:

Math 040 (Beginning Algebra) with a C or better, **OR** assignment by MCC Math Placement Test, **OR** ACT Math score of 19 or higher.

Required Materials:

- ➢ *Math 107A*, a custom text based on *Mathematical Excursions, 3rd Edition* by Aufmann, Lockwood, et al. eBook is available online or through Web Assign.
- ➢ Web Assign Access Code. (This comes with the custom Math 107A loose-leaf book.)
- ➢ Internet, Email, and Blackboard Access.
- ➢ TI-30X or higher calculator.

Course Content: By the end of the term we will have studied a variety of mathematical ideas (not necessarily in this order) and you will be able to:

(The Mathematics of Money)
Summarize the relationship between time and money
Explain how credit cards, loans, savings, and investments work
Use various tables and internet calculators to find loan payments
Use various tables and internet calculators to find the future values of one-time and regular investments
Calculate lifetime interest on loans and the long-term cost of recurring debt
Quantify the effects of delaying saving and the effects of delaying spending
Compare and contrast the long term effects of various financial decisions

(The Mathematics of Voting and Representation)
Describe the similarities and differences among the processes of approval, selection, and election
Explain what constitutes plurality, majority, consensus, dissent, unanimity, and fairness
Apply a variety of voting methods and strategies to given ballot data
Apply multiple algorithms for apportionment to given population data
Describe inherent flaws in voting systems
Describe inherent flaws in apportionment algorithms
Assess biases associated with common voting and apportionment methods

(The Mathematics of Chance)
Define probability as a measure of likelihood and use the [0, 1] convention

Apply basic probability rules to discrete events
Use Venn diagrams and correct vocabulary, such as "mutually exclusive"
Employ proper counting techniques to compute probabilities assuming equally likely outcomes
Compute the expected value of a game of chance with discrete outcomes
Analyze how probability is used in the marketplace, especially with regard to driving history, credit scores, etc.
Distinguish between discrete and continuous situations

<u>(The Mathematics of Arguments)</u>
Construct truth tables (with up to three statements) for the AND, OR, NOT operators
Construct truth tables (with up to three statements) for complex logical operations, including XOR
Identify and explain contradictions and tautologies.
Explain the concept of implication (or conditional)
Write converses, inverses, and contrapositives of implications (or conditionals)
Quantify the difference between "if" and "if and only if" statements
Assess the validity of implications by constructing truth tables

<u>(The Mathematics of Networks)</u>
Construct and interpret vertex-edge graphs based on adjacency, proximity, or other given properties
Compute the number of edges and degrees of vertices in common graphs, including trees and complete graphs
Recognize relationships in graphs and determining whether claims about graphs are valid
Distinguish between Hamilton paths and Euler circuits in graphs
Use simple theorems to determine whether or not given graphs contain Hamilton paths and Euler circuits
Construct digraphs and weighted graphs from maps and other route or cost information
Apply algorithms to digraphs and weighted graphs to find minimal spanning trees and shortest (or cheapest) routes

Attendance and Absences:

Students who do not attend almost every class may find it very difficult to pass this class. If you are absent, there are three reasons your absence will be considered "excused." These reasons are (1) serious illness (including your family), (2) military service, and (3) bereavement (up to two classes.) Other reasons, including work schedules and family obligations, will be considered unexcused and will result in a zero on missed assignments or tests.

In-Class Problems:

Frequent opportunities to solve problems will be given during class. These problems are open note and may be done in small groups. The purposes of these problems are (1) to help you construct a correct understanding of methods discussed in class in a way that is "local in time," and (2) to help you overcome any misconceptions you may have about these methods. If you miss class due to an unexcused absence, you will not be given credit for these problems, as solutions to these problems will generally be posted on Blackboard before the next class session.

Web Assign Problem Sets:

Numerous online homework sets will be assigned throughout the semester. These problems will be selected from the course textbook and distributed only as Web Assign assignments. Web Assign allows multiple attempts on each problem and asks slightly different problems of different students. Each Web Assign assignment will have a due date, after which reduced or no credit can be earned. **NOTE:** Some textbook sections may have no Web Assign problem set. For theses sections, the in-class problems may be the only practice problems you receive.

Problem Solving Points:

At the end of the term, your instructor will assign a score from 1 to 10 based on the level of problem solving skills you demonstrate throughout the term. This is a holistic component and will be based on many factors evident in your problem solutions. These factors include (but are not limited to) completeness, legibility, organization, reasonability of methods chosen, reasonability of solutions obtained, and types of errors made.

Final Exam and Test Absences:

All students must take the final exam. If the official exam schedule has a conflict, we will determine an alternate time for you to take the final exam. You are permitted to use one page of notes on the final exam. These must be your notes and cannot be my work or the work of other students. If you have an excused absence from any other test, you will be required to take it at the MCC Testing Center. If you have an unexcused absence from a test (or turn it in late) no credit will be given.

Course Grading:

In-Class work	70
Web Assign Average	100
Test 1 (Ch. 1 & 2)	100
Test 2 (Ch. 3 & 4)	130
Test 3 (Ch. 5 & 11)	140
Final Exam (Ch. 12 and Review)	150
Problem Solving Points	10
Total Points (T)	**700**

Letter grades will be determined by the table:

Pts (T)→Letter	[609, 629]→B+	[539, 559]→C+	[465, 489]→D+
[658, 700]→A	[581, 608]→B	[511, 538]→C	[420, 464]→D
[630, 657]→A−	[560, 580]→B−	[490, 510]→C−	[0, 419]→E

Statement on Student Assessment and Accreditation

Muskegon Community College is fully accredited by the Higher Learning Commission located in Chicago (http:ncahlc.org/). The Higher Learning Commission accredits degree granting postsecondary educational institutions in the North Central Region. Accreditation helps ensure students that they are receiving a quality education and can transfer to other colleges and universities with ease and confidence. MCC is committed to an essential part of the accreditation process: assessing student learning. You will likely be asked to participate in assessment activities as part of MCC's assessment of programs and general education.

Statement on MCC Email

All email Communication originating from MCC to students will be via their email account. CHECK YOUR MCC EMAIL FREQUENTLY.

Statement on Student Behavior

Muskegon Community College is a community of scholars whose members include administrators, faculty, staff, and students. Mutual respect and civility are expected in the classroom or other college academic settings, as well as, in any communication.

- MCC has the duty of providing students with privileges, opportunities, and protections that best promote learning;
- Students have the right to a non-threatening learning environment;
- Students have the responsibility to refrain from infringing on the right of others to learn or the right of teachers to teach; and
- Any student whose behavior disrupts learning may be subject to disciplinary action as outlined in the Muskegon Community College Catalog.

Academic Integrity Policy

Muskegon Community College expects that all faculty and students will adhere to high standards of personal and academic honesty. This means that all academic work will be done by the student to whom it is assigned without unauthorized aid of any kind. Faculty members, for their part, will exercise care in the planning and supervision of academic work so that honest effort will be positively encouraged.

Academic dishonesty consists of, but is not limited to:

- Cheating. Cheating is defined as using or attempting to use, giving or attempting to give, and obtaining or attempting to obtain, materials or information, including computer material pertaining to a quiz, examination, or other work that a student is expected to do alone.
- Plagiarism. Plagiarism is defined as the use of another's words or ideas without acknowledgement.
- Penalties for violation of these standards of conduct may result in sanctions of up to and including suspension or expulsion from MCC.

Statement on Dispute Resolution Process

Should a student not agree with a faculty member's decision or actions as they may relate to this policy, the following steps shall be followed:

1. A student suspected of academic dishonesty shall be notified in writing within two school days of the time the violation is discovered. Copies of the written notification shall also be filed with the department chair and Vice President of Student Services.
2. The student should try to reach resolution of the matter through direct discussion with the involved faculty member within three (3) school days of the written notification.
3. If the matter is not resolved in Step 2, the student shall bring the matter to the attention of the department chairperson of the involved faculty member.
4. If the matter is not resolved at the department chairperson level, the student shall bring the matter to the attention of the Dean of Instruction (Academic Affairs Office) who shall render a decision within five school days of the receipt of the dispute information.
5. If a satisfactory solution is not reached at the Step 4 level, the student may file a written request with the Vice President of Student Services for a hearing before the disciplinary board. This meeting shall be held not more than 20 days following the written request. A student may request a hearing before the disciplinary board. The disciplinary and judicial procedures are outlined in the Muskegon Community College Catalog.