

# Math 107 – Problem Solving - 3 credits

(Subject to change)

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MTH 107 Problem Solving fulfills the requirement for a Foundational Area of Knowledge in Mathematical Reasoning. A course that fulfills that requirement will ensure that students learn basic strategies of mathematical thought in order to analyze complex scenarios, explain conclusions, and think more effectively. Students will utilize a variety of problem solving approaches to mathematical problems, and will strive to:

1. analyze and model mathematical situations using a variety of techniques to solve problems effectively
2. communicate a clear understanding of conclusions
3. apply mathematical systems of thinking

**Course Description** – An introductory liberal arts course emphasizing the many uses and practical applications of mathematical problem-solving.

**More Detailed Course Description** – “math thinking” is used every day in all kinds of organizations; business, industry, government, and not-for-profit, etc., to make decisions that will result in greater profits, better use of resources, and optimal employee performance. We will examine methods for achieving dramatic results by replacing “seat-of-the-pants” approaches with systematic analysis. The underlying theme of this course is to find the best solution to every problem. It substitutes quantitative thinking and analysis for guesswork and hope.

**Prerequisites** – Passing grade on the Doane Math Competency Exam.

**Who should take this course** – MTH 107 is required for all students wanting to meet the math requirement for a General Education major. This class could also serve as an elective for any Business or Accounting major.

This course will empower students mathematically and develop creative-thinking skills that will last a lifetime!.

**Text** – None

**Philosophy and Goals** – Problem solving is a very important part of learning mathematics. Good problem-solving skills don't necessarily come naturally but can be taught. Students need many opportunities to practice problem-solving strategies, and they need to learn how to choose an appropriate strategy to solve a given problem. This course is designed to give students a firm problem-solving foundation. It also teaches them to think and work together, present solutions orally to the whole class, and write up detailed solutions. In other words, it helps to prepare them for life, as well as for future mathematics courses. Hence, written and oral communication skills are an important emphasis of the course.

**Probable Course Topics include but are not limited to –**

- |                           |                          |
|---------------------------|--------------------------|
| △ Draw a Diagram          | △ Make a Systematic List |
| △ Eliminate Possibilities | △ Work Backwards         |
| △ Look for a Pattern      | △ Guess and Check        |
| △ Identify Subproblems    |                          |

**Expectations for Instructor and Students –**

Students – Embrace the role of a problem solver. Encourage, support,

and respect all group (and class) members. Assume an equal share of the workload. Attend ALL sessions. Complete all homework to the best of your ability. LEARN & HAVE FUN!

Instructor – Guide students in developing their mathematics and communication skills. Provide a classroom environment where students feel it is O.K. to be wrong, ask questions and to be encouraged to think differently.

### **Class Agenda**

1. Go over homework from prior week (Sessions 2-7)
2. Problem-Solving Strategy Intro Activities
3. Problem-Solving Strategy Modeled/Discussed
4. Cooperative Groups – Text Problems
5. Group Presentations
6. Group Help Time

### **Course Schedule**

Session #1      Introductions  
Discussion of Course Objectives & Operational Policies  
Teams: Assignments & Building Activity  
Discussion of New Problem Solving Strategy  
Group Problem Solving  
Group Presentations

Sessions #2-7    Discussion of New Problem Solving Strategy  
Group Problem Solving  
Group Presentations

Session #8      Final Exam

### **Evaluation**

Grade Composition:    50% Group Participation / Class Presentations  
                                     50% Homework / Final Exam

7 homework problems will be assigned each week and will be assessed based on how well you used the strategy for that particular week. The final exam will consist of 14 problems (2 from each strategy used during the course) and assessed on how well you employed the different strategies.

Your grade will be based on the following percentage scale:

A+	98-100	C+	77-79
A	94-97	C	73-76
A-	90-93	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62

\*Homework – Turn in your homework using the following guidelines:

Δ write in pencil

Δ box answers Δ include answer rationale

**\*\*Points will be deducted each day for work turned in late.**

### **Course Absence Policy**

Given that you are assigned to teams each week, teams will suffer in the event that you have an absence. If an emergency should arise and you need to miss class, text or call me ASAP in order to make arrangements for getting anything you might need for the next class. **Note—You are still responsible for getting the homework turned in on the due date even if you are absent.**

**\*\* 2 Absences = Automatic Failure \*\***

### **Academic Integrity Policy**

The Doane College Academic Policy will be adhered to in the class. All homework & tests should be done without the assistance from outside sources. Any violation of these policies can result in a loss of points for that particular assignment.

If another student in the class asks for help, and you refuse to give it, you fail the course. You will be working in teams. Everyone is expected to work together, whether in discussions, presentations or on the final exam.

If you present an idea that is really someone else's idea and you know that, give the person credit. In other words, DO NOT present something that is someone else's as your own.

**\*\*In the name of courtesy to both classmates and instructor, please, no answering of or texting on cell phones during class.**