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

MTH 107 will seek to accomplish all of these outcomes, with the greatest emphasis on Learning Outcomes No. 1 and No. 3. Students will learn basic strategies of mathematical thought in order to analyze complex scenarios, make connections, solve problems, explain conclusions, and think more effectively.

Required texts: None

Course description: This is a basic problem-solving course suitable for students in any major. A survey of a wide variety of problem solving strategies. Students successfully completing this course will effectively communicate mathematically, utilize various strategies in analyzing problems, and increase problem solving persistence and sharpen problem solving skills.

Course foundation: “Math thinking” is used every day, in all kinds of organizations, business, industry, government, and non-profit, to make decisions that will result in greater profit, better utilization of resources, optimal employee performance, etc. In this course 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 identify the best possible solution to every problem; substituting quantitative thinking for guesswork and hope.

Course goals: Problem solving is a very important part of mathematics. Good problem-solving skills don’t necessarily come naturally. However, they can be learned. This course is designed to give students a firm foundation in problem-solving. Students will be given the opportunity to practice problem-solving strategies, as well as to select the appropriate strategy to solve particular problems. The course will provide students with the opportunity to think and work individually and as a group, to present solutions orally to the group, and to explain processes utilized in solving particular problems.

At the conclusion of the course, students will understand:

- Problem solving by rational organization of problem components through diagramming
- Problem solving by creating systematic lists of pertinent issues necessary for consideration
- Problem solving by eliminating possibilities until the most effective solution is discovered
- Problem solving through patterns at play within the dynamics of the component issues
- Problem solving through a “guess-and-check” approach to determining potential solutions
- Problem solving by creating physical representations of problem components in proper context
- Problem solving by working backwards from the desired resolution through the most effective process
Class Sessions:

Class No. 1

Introductions
Discussion of course objectives and processes
The use of PODs (Problem of the Day)
Explaining the Journal
Problem Solving by Diagramming
Individual/Group Problem Solving
POD Assignment

Class No. 2

Individual POD Presentations
Problem Solving by Creating Systematic Lists
Individual/Group Problem Solving
POD Assignment

Class No. 3

Individual POD Presentations
Problem Solving by Eliminating Possibilities
Individual/Group Problem Solving
POD Assignment

Class No. 4

Individual POD Presentations
Problem Solving by Observing Patterns
Individual/Group Problem Solving
POD Assignment

Class No. 5

Individual POD Presentations
Problem Solving by “Guess-and-Check”
Individual/Group Problem Solving
POD Assignment

Class No. 6

Individual POD Presentations
Problem Solving by Physical Representations
Individual/Group Problem Solving
POD Assignment
Class No. 7

Individual POD Presentations
Problem Solving by Working Backwards
Individual/Group Problem Solving
POD Assignment

Class No. 8

Individual POD Presentations
Problem Solving by Converting to Algebra
Individual/Group Problem Solving
Individual Presentations
Journals Due
Class Re-Cap

The course outline is subject to change based upon class progress. Homework may be assigned throughout the term, as appropriate. Doane College makes all decisions regarding the cancellation of classes due to bad weather. In the event of a cancelled class, assignments carry over to the next class time.

Grading:

Grading will be on a 100 point scale, with points earned as follows:

POD Presentations 2 @ 20 points max each
Individual Presentation @ 40 points max
Journal @ 20 points max
Total Possible Score of 100 points max

Grading Scale

90 – 100 = A
80 – 89 = B
70 – 79 = C
60 – 69 = D
<60 = F

Absences:

One absence will have no effect on your grade. Two absences will result in the lowering of your grade by one letter. Three absences will result in failure of the course. Exceptions to this policy will be made rarely, only in the most uncontrollable of personal situations, and completely at the discretion of the instructor. Please plan on being present at all classes.

Academic Integrity

The Doane College Academic Integrity Policy will be adhered to in this class. In the course of your preparation for papers, examinations, projects, and presentations you will be asked to work with others and/or rely on the opinions, writings, or research of others. This is perfectly acceptable and in most instances is expected. However, when you use another’s words, ideas, or opinions – cite it! I fully expect that your ideas will from time to time spring from the ideas of others. Let me know when you are using those ideas, and whose ideas they are. The use of other sources without proper citation is unfair to the source and to you. It will result in failure of the project, examination, or paper in which the reference was used and will possibly result in failure of the course.