Motivation

Mathematicians enjoy solving challenging problems.

Learning Goals

By the end of the course, students will do the following:

1. Describe and use selected general strategies and specific techniques for solving mathematical problems.
2. Solve non-routine mathematical problems independently and collaboratively.
3. Communicate solutions in writing and orally.
4. Have fun discussing and solving mathematical problems.

Instructor

David Housman, SC 117, dhousman@goshen.edu, 535-7405 (office), 875-0339 (H)
See office door or Moodle for availability.

Class Time

T 12:30-1:45pm in SC 107.

Structure

This is a seminar, not a lecture, course. It depends heavily on the active attendance and participation of all who are enrolled. Participation takes at least three forms: (1) prepare and present solutions to problems, (2) reflect upon and describe the process, strategies, and techniques used to solve problems, and (3) listen to others and publicly assess their work. Since the problems, strategies, and techniques considered can vary from year to year and among individuals, this course can be repeated for credit.

Prerequisites

Students should be able to read and write mathematical proofs at a level equivalent to successful completion of Math 205 Discrete Mathematics and Math 212 Calculus II.

Resources

There is no required text for the course. If this were a 3-credit course, we might have asked you to buy *The Art and Craft of Problem Solving* by Paul Zeitz or *Problem-Solving Through Problems* by Loren C. Larson. There are a number of problem solving books in the Good Library (try browsing around QA 43 and QA 63), in the Math Reading Room, and in the instructor’s office.

Journal

Seminar participants are expected to keep a problem-solving journal in which all problems considered and work done on them is recorded. Include rough work and “false starts” as well as the polished end product. It is especially important to reflect upon the process that led you to a solution. These journals will be reviewed a few times during the semester.

Reflection Paper

Due at the end of the semester, this paper will describe two problem solving heuristics, explain how you used each heuristic in trying to solve two problems, and assess the effectiveness of each heuristic.

Solution Paper

Due at the end of the semester, this paper will state a problem and provide its solution.
Contests

Seminar participants are encouraged to participate in the Indiana College Mathematics Competition (ICMC) that will be held this year on Friday, March 13 at Taylor University. This is a team competition in which teams of up to three students work together on a set of problems for about two hours. For a more applied option, there is the Mathematics Competition in Modeling (MCM) to be held on campus February 5-9, 2015. This is an international team competition in which teams of up to three students work on a single problem for an entire weekend.

Grading

Your grade will be based upon the quality and quantity of work done in solving problems, communicating the solutions, and describing the process. Evidence will be provided by class participation, journal entries, the reflection paper, the solution paper, and contest participation. Excellent, very good, good, or adequate work will earn grades of A, B, C, or D, respectively.

Academic Resource & Writing Center and Disabilities

Goshen College wants to help all students be as academically successful as possible. If you have a disability and require accommodations, please contact Lois Martin, the Director of the Academic Resource & Writing Center early in the semester. In order to receive accommodations, documentation concerning your disability must be on file with the Academic Resource & Writing Center, Good Library 113, x7576, lmartin@goshen.edu. All information will be held in the strictest confidence. The Academic Resource & Writing Center offers tutoring and writing assistance for all students. For further information please see http://www.goshen.edu/studentlife/arwc.

Collaboration and Academic Integrity

You are encouraged to use all available resources in order to learn the concepts and techniques discussed in this course. In particular, conversations with other students and the instructor can be an effective learning method. Reading other books and web pages can be another effective learning method. However, copying someone else's work subverts the learning process.

For assignments, you may look at and discuss another student's work, but you should try to rewrite solutions on your own. You should give written acknowledgement to people with whom you have had discussions and to any written materials that were helpful.

Failure to observe the above rules will result in a penalty ranging from a zero on the assignment or exam to immediate failure of the course. Any violation of academic integrity will be reported to the Academic Dean.

Observation of the above rules will help you learn the material well and give you the satisfaction of knowing that you have earned your grade.