GOSHEN COLLEGE
MATHEMATICS DEPARTMENT
MATH 390 PROBLEM SOLVING SEMINAR - SPRING 2022-23

Motivation	Mathematicians enjoy solving challenging problems.
Catalog Description	The problem-solving process in the context of nonroutine problems, including a wide variety of general heuristics for approaching such problems. May be repeated. Prerequisite: Math 205 or 212. (1 credit hour)
Learning Goals	The student will 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; and 4. Have fun discussing and solving mathematical problems.
Instructor	David Housman, SC 117, dhousman@goshen.edu, 535-7405 (office) See office door or Moodle for availability.
Class Time	Thursdays 2:00-3:15 PM in AD 21.
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 or 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 by the instructor 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.
Presentation	You will present (a portion or draft of) your reflection or solution paper during the Academic Symposium on April 12.

Contests

Seminar participants are encouraged to participate in the Indiana College Mathematics Competition (ICMC) that will be held on March 31 at Indiana University Kokomo. This is a competition in which teams of up to three students work together on a set of problems for two hours. For a more applied option, there is the Mathematics Competition in Modeling (MCM) to be held on campus February 16-20. This is an international 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, describing the process, and providing constructive feedback to others. Evidence will be provided by class participation, journal entries, the reflection paper, the solution paper, presentation, contest participation, and completing the course evaluation. Excellent, very good, good, or adequate work will earn grades of A, B, C, or D, respectively.

Learning Assistance

The Academic Success Center offers individual tutoring by appointment at tutorcal.goshen.edu. Unfortunately, the only a student around who has previously taken this course course is Asa Schiller. You might obtain help from him during one of his Math 212 study sessions. Of course, you could make use of David's office hours.

Disability Services

Goshen College is committed to providing all students equal access to programs and facilities. Students who need accommodations based on disability should contact Judy Weaver, coordinator of access services. You can contact Judy by visiting the Academic Success Center (ASC) in the library, emailing jweaver@goshen.edu or calling 574-535-7560. Students must register with ASC before faculty are required to provide reasonable accommodations. To ensure that learning needs are met, contact the coordinator of access services by the first week of classes.

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.