MATH 316 – Discrete Mathematics
3 Credit Hours
Black Hills State University
Spring 2008

I. Time and Location: TTH 12:30 – 1:45 pm, BJA 109

II. Instructor:

Daluss J. Siewert, Ph.D.
Office: J163
Office Hours: WF 2:00 – 3:00 pm
TTH 11:30 – 12:30 pm
(In addition, office visits by appointment are encouraged.)
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III. Catalog Description: Selected topics from Boolean algebra, set theory, logic, functions and relations, difference equations, recurrence relations, applications of algorithms, finite graphs, trees, paths and modeling.

IV. Course Prerequisite: MATH 125 OR consent of instructor.

V. Instructional Methods: Lectures and class discussions.

VI. Course Requirements:

Required Textbook: Goodaire & Parmenter, *Discrete Mathematics with Graph Theory, 3rd Edition,* 2006, Prentice Hall.

Attendance Policy: By university policy, enrollment in a class implies the responsibility for attending each class session. Students will be allowed to make up graded work if an absence is due to participation in university-sponsored activities, provided prior notification of the impending absence has been given to the instructor.

Cheating and Plagiarism Policy: In this course you are expected to perform to the utmost of your abilities in an honest and sincere manner. Cheating and plagiarism will not be tolerated. Academic misconduct will be dealt with per BOR regulations.

Make-Up Policy: Except in the case of a documented emergency, or the absence caused by a university sponsored activity, no makeup tests are allowed and no late homework will be accepted. The burden of proof regarding the absence rests with the student. Students that were absent with a documented emergency or university sponsored activity must see the instructor to make arrangements for taking a makeup exam.

Technology Policy: A calculator is required for this course. A TI-82 or 83 is sufficient. Also, the use of the Maple software will be required for the programming project(s). The use of Maple 11 is recommended. This software is available on the computers in Jonas Science Room 154.

VII. Course Objectives:

Student Learning Outcomes: Students completing this course will be able to:

1. Think mathematically and reason logically. Assessment will be through class discussion.

2. Write proofs of elementary mathematical facts. Assessment will be through graded homework problems and examinations.

3. Demonstrate knowledge of the fundamental arithmetic properties of the integers. Assessment will be through graded homework problems and examinations.

4. Demonstrate knowledge of basic set theory, congruences, applications of congruences, recurrence relations, and graph theory. Assessment will be through graded homework problems and examinations.

5. Demonstrate knowledge of introductory graph theory, including graph isomorphisms, Eulerian circuits, Hamiltonian cycles, shortest path algorithms, digraphs, and tournaments. Assessment will be through graded homework problems and examinations.

6. Apply the fundamental ideas of discrete mathematics in the formulation and solution of problems. Assessment will be through graded homework problems and examinations.

VIII. Student Evaluation Procedures:

Final grades will be based on the results of homework/projects, two unit examinations, and a comprehensive final examination. Grading will be by letter grades according to the following percentages:
90 -- 100 => A; 80 -- 89 => B; 70 -- 79 => C; 60 -- 69 => D; less than 59 => F.

Homework/Quizzes: Homework will form an important part of this course. Homework will account for 20% of the final grade. Your lowest homework score will not count towards your final grade. Homework procedures and assignments will be discussed in class and posted on the web page. True/False quizzes related to the true/false questions in the text may be given periodically. Your mean score on these quizzes will count as one homework assignment.
Unit Exams: Each unit exam will account for 20% of the final grade. These exams will be closed book.
Final Exam: A comprehensive final examination will account for 25% of the final grade.
Project: A project will account for 15% of the final grade. The project will consist of creating a poster to present at the Mathematical Association of America (MAA) regional meeting at BHSU on April 25th and 26th. The poster contest does not have a specific theme; however, the poster should be on a topic related to discrete mathematics. Any poster with mathematical content related to discrete mathematics is appropriate. The topic does not need to be something we discussed in class. If you receive any prize at the poster contest, you will be guaranteed an "A" on this project. Additional poster project details will be discussed in class as appropriate. No late projects/posters will be accepted.

Check the web page or ask your instructor for the tentative dates of the exams.

IX. ADA Statement: Reasonable accommodations, as arranged through the Disabilities Services Coordinator, will be provided students with documented disabilities. Contact the BHSU Disabilities Services Coordinator at 642-6099 (room 022 in the Student Union) for more information.

X. Academic Freedom and Responsibility: Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the chair of the department in which the course is being taught to initiate a review of the evaluation.

XI. Tentative Course Outline/Schedule

Week 1	Compound statements. Proofs in mathematics.
Week 2	Truth tables. Algebra of propositions. Logical arguments
Week 3	Proofs in Mathematics. Sets.
Week 4	Operations on Sets. Binary relations. Equivalence relations.
Week 5	The Division Algorithm. Divisibility and the Euclidean Algorithm.
Week 6	Prime numbers.
Week 7	Catch up day. Exam 1.
Week 8	Congruence. Applications of congruence.
Week 9	Mathematical induction.
	Spring Break
Week 10	Recursively defined sequences. Solving recurrence relations.
Week 11	Catch up day. Exam 2.
Week 12	Introduction to graph theory. Graph isomorphisms.
Week 13	Eulerian circuits. Hamiltonian cycles. Shortest path algorithms.
Week 14	The adjacency matrix. Digraphs
Week 15	Tournaments. Shortest Path Algorithms. Additional topics of interest.