

Math 216

Spring 2016

## Discrete Mathematical Structures and Proof

**Class Meeting:** MWF 1:10 - 2:20 in PPHAC 235

**Instructor:** Nathan Shank

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**Office Phone:** 610-861-1373

**Office Location:** PPHAC 219

**Office Hours:** Monday and Friday 9:00 - 10:00, Wednesday 11:30 - 1:00.

**Text:** *Mathematics: A Discrete Introduction*, Edward Scheinerman, 2011, Second Edition, Brooks-Cole.

**Course Goals:** The main purpose of this course is to provide you with the necessary skills and background to successfully study and communicate advanced mathematics and computer science topics. Mathematical writing is an essential part of the course. Specific course goals are to:

- improve your ability to read and understand mathematical definitions and proofs
- help you learn how to construct mathematical proofs
- help you learn how to write mathematical proofs
- help you learn how to communicate mathematical ideas to different audiences
- help you learn about basic mathematical structures that are useful for further study of mathematics and related sciences

**Course Topics:** The course focuses on a study of mathematical logic and types of mathematical proof, including induction and combinatorial arguments. We will investigate set theory, relations, function, cardinality of sets, basic number theory, recurrences, and graphs.

We will explore more sections in chapter 1 through 5 and 9 of the text along with portions of chapter 6 through 10. Topics include: the foundations of logic and proofs; basic structures such as sets, functions, and sequences the fundamentals of algorithms and the integers; induction and recursion; counting; relations; an introduction to graph theory.

The class will be a mixture of short lectures, questions and discussion, and classroom activities that will make you investigate different mathematical topics. Active participation during class meetings is expected from each student. Some activities will involve working in a group, or working individually.

### **Assignments/Assessment:**

- **Written Homework:** As you know math is not a spectator sport. You need to practice what you learn. Homework will be assigned daily and it will be collected at the beginning of class. As with other written assignments in other courses the homework you hand in should not be your first draft. First attempt at homework should be done on your own. If you still need assistance you may ask for a hint from a classmate or work on the problem together. However acquiring an entire solution from a classmate is not acceptable. Homework is to be written up individually. Any collaboration must be properly documented. If two or more homework sets look similar, no points will be awarded for the entire homework set (with no warning). Please see the section on academic honesty policy for more information. You are always welcome to come to office hours to see the instructor. Late homework will not be accepted for a grade. Homework should be neatly written. If you need paper, please see me.
- **In-Class Assignments:** There will be several in class assignments throughout the course. Some of these assignments will be done individually, and some may be completed as a group. These weekly in-class assignments are to reinforce the material learned over the previous few days and apply the material to realistic problems.
- **Papers:** There will be at least two papers for this course. More information on the papers will be given later in the course.
- **Tests and Final Exam:** You will have **three** tests and a cumulative final exam. The tests are tentatively scheduled for Friday, February

19, Wednesday, March 23, and Wednesday April 27. The final exam is scheduled for Thursday, May 5, 11:30 - 1:30.

- **Participation:** In a class of this size, participation is mandatory. You are expected to give input during all class discussions. At the end of the course, the instructor, yourself, and your classmates will evaluate your participation in class. This will be included as part of your In-Class Assignments.

**Grading:** You are responsible to keep track of your own grade. Grades will be computed as follows:

Homework	20%
In-Class assignments	20%
Papers	10%
Tests	10% each
Final Exam	20%

**Class Structure:** Class will consist of lecture, group work, individual work, and problem sessions. Please come to class prepared with your text, and notes. Please be prepared to participate in class. Class will start promptly at the start time, and class will not end early.

**Attendance:** Attendance will be taken everyday. There is a very strong correlation between attendance and grades. In order to understand the material, you need to be present in class. Group work also requires every one's participation. Be sure to let me or a fellow student know by email or a phone call if you are not going to be in class. It is your responsibility to get any material you miss. Any student missing more than three classes will lose two percentage points off their final grade for each additional absence. Remember that no late homework is accepted.

**Academic Honesty:** For graded homework assignments and projects, you may use your class notes and any books or library sources except a solutions manual. Any resources (including people) you use must be documented at the top of the homework assignment. As an example if you get help from Bob for problem 4 only, please write "Help with problem 4 from Bob". No points will be deducted for honestly acknowledging help. However if you do not document any appropriate resource this is considered cheating.

The College academic honesty policy appears in your Student Handbook; you are expected to be familiar with it. The Academic Honesty Policy Guidelines specific to mathematics classes are reiterated at the end of the syllabus. They apply to work done outside of class as well as to in-class quizzes and tests. Please read them carefully. If you are unsure about the propriety of a particular procedure or approach, please consult with your instructor before continuing with the assignment.

**Special Accommodations:** Students who wish to request accommodations in this class for a disability should contact the Academic Support Center, located in the lower level of Monocacy Hall, or by calling 610-861-1401. Accommodations cannot be provided until authorization is received from the Academic Support Center.

### **Academic Honesty Policy Guidelines Mathematics Courses**

The Department of Mathematics and Computer Science supports and is governed by the Academic Honesty Policy of Moravian College as stated in the Moravian College Students Handbook. The following statements will help clarify the policies of members of the Mathematics faculty.

In all homework assignments which are to be graded, you may use your class notes and any books or library sources. When you use the ideas or thought of others, however, you must acknowledge the source. For graded homework assignments, you may not use a solution manual or the help, orally or in written form, of an individual other than your instructor. If you receive help from anyone other than your instructor or if you fail to reference your sources you will be violating the Academic Honesty Policy of Moravian College. For homework which is not to be graded, if you choose, you may work with your fellow students. You are responsible for understanding and being able to explain the solution of all assigned problems, both graded and ungraded.

All in-class or take home tests and quizzes are to be completed by you alone without the aid of books, study sheets or formula sheets unless specifically allowed by your instructor for a particular test.