MATH 131, Spring 2016: Discrete Mathematics

Instructor	Dr. Karin Saoub Trexler Hall 270F	*Phone:* (540) 375-2348 *Email:* saoub@roanoke.edu

Class Meetings Mondays, Wednesdays, Fridays: 1:10 – 2:10 PM in Lucas 127
This course expects you to spend at least 12 hours of work each week inside and outside of class.

Office Hours Mondays, Thursdays: 9:00 - 10:00 AM
Tuesdays: 1:00 - 2:00 PM
Wednesdays, Fridays: 10:45 - 11:30 AM
and by appointment (email me)

Intended Learning Outcomes This course provides an introduction to both theoretical and applied mathematical topics not covered in a calculus course, and introduces the ideas and techniques of formal logic and mathematical proofs. By the end of this course, successful students will be able to produce mathematical proofs, understand the different types of proofs, and critique proofs on correctness. Successful students will also understand the basics of graph theory and recursion.

Required Materials Textbook: *Discrete Mathematics*; Epp, Brief Edition
All work on homework, quizzes, and tests should be legible and done in pencil.

Course Grades The following table lists the weights for the various forms of assessment for this class.

Homework⁄Quizzes	20%
Presentation	5%
Tests (10% each)	60%
Final Exam	15%

A grade scale will be determined after final grades are computed, but will be no worse than the scale given below. Attendance and class participation will be considered when determining marginal grades.

		B+	87-89	C+	77-79	D+	67-69	
A	94-100	B	83-86	C	73-76	D	63-66	F 0-59
A-	90-93	B-	80-82	C-	70-72	D-	60-62	

==**Academic Integrity**== ==Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be your own work! No collaboration is allowed on quizzes or tests. Unless otherwise stated, you many work together on the homework, but should write up your solutions separately.==

==Cell phones must be turned off prior to entering the classroom. Laptops may be used for note-taking during regular class sessions, if this seems useful to you, but you may not log on to the internet or to an email server unless specifically told to do so. The use of laptops and other electronic devices during an exam is strictly prohibited. This includes tablets, smart phones, and iPods. Any use of such devices during a quiz or exam will be considered a breach of academic integrity.==

Reading & Participation	The key to learning a topic in mathematics is participation. We will strive to have an active, rather than passive, classroom environment. The last page of the syllabus is a day by day outline of the sections that will be discussed in class. You are fully expected to have read the upcoming section **before** the class meeting!
Attendance & Make-Up Work	Attendance is critical to the understanding of the material in the course; it is both required and expected. Any absence that is not discussed with the instructor prior to the missed class is considered unexcused. I will assume that if you accumulate 4 unexcused absences you are not interested in completing the course. After the 3rd unexcused absence, you, your advisor, and the registrar will be warned that another absence will result in your removal from the class (DF). *When absent, excused or unexcused, you are responsible for all material covered in class. You will not be allowed to make up any work missed due to an unexcused absence.*
Homework	Homework will be assigned regularly in this class (virtually every class period). Do not wait to start these until the night before the next class period! Most days some work will be collected and graded. The problems will serve as good examples on what is covered on tests. Three problems will be graded for correctness (for 6 points total), and the remainder will be graded for completion (for 4 additional points). You many discuss the homework with classmates, but all write-ups should be done separately. If you will be absent, turn in your homework before the class period it is due, or have a friend turn it in for you. Late homework will only be accepted within 2 days of the original due date and will automatically lose the completion points.
Quizzes	There will be quizzes in this class every other Friday. They may either be in-class quizzes or take-home quizzes. These will focus on definitions and short answers problems.
Tests & Final Exam	Six tests will be given roughly every sixth day (see the schedule on page 3). Each test will focus on the material learned since the last test, but as with most mathematics classes, the exam will require you to understand and remember things from the past. ==The final exam will be comprehensive and given during the scheduled time for the final exam for Block 5: Monday May 2, 2:00 – 5:00 PM.==
Presentations	Each student will give an 8-minute presentation during the final week of classes. It will consist of material related to what we have seen in lectures but did not cover in depth. A list of available topics and further instructions will be available on Inquire after Spring Break.
MCSP Conversation Series	The MCSP Department offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions engage the community to think about ongoing research, novel applications and other issues that face our discipline. Members of this class are invited be involved with all of these meetings; however participation in at least **two** of these sessions is mandatory. After attending, submit a one page paper reflecting on the discussion. This should not simply be a regurgitation of the content, but rather a personal contemplation of the experience. This reaction paper will be counted as a quiz and should be uploaded to Inquire using the appropriate link. If you are caught leaving the talk early or being disruptive, you will receive a 0 on the assignment.

Other Stuff   The MCSP Department hosts a weekly tea time for students and faculty; please feel free to stop by the MCSP Study Lounge (Trexler 271) for tea and cookies on Thursdays from 2:30 PM to 3:30 PM. Also, our Student Chapter of the Mathematical Association of America (Math Club) is looking for members to have fun hanging out and talking about some fun math topics!

Tentative Course Schedule

	Date	Section	Topic
Mon	Jan 18	1	Introduction & Speaking Mathematically
Wed	Jan 20	2.1	Logical Forms and Equivalence
Fri	Jan 22	2.2	Conditional Statements
Mon	Jan 25	2.3	Valid and Invalid Arguments
Wed	Jan 27	3.1	Predicates and Quantified Statements I
Fri	Jan 29		**Test 1**
Mon	Feb 1	3.2	Predicates and Quantified Statements II
Wed	Feb 3	3.3	Statements Containing Multiple Quantifiers
Fri	Feb 5	3.4	Arguments with Quantified Statements
Mon	Feb 8	10	Graphs: An Introduction
Wed	Feb 10	4.1	Direct Proof and Counterexample I: Introduction
Fri	Feb 12		**Test 2**
Mon	Feb 15	4.1	Direct Proof and Counterexample I: Introduction
Wed	Feb 17	4.2	Direct Proof and Counterexample II: Rational Numbers
Fri	Feb 19	4.3	Direct Proof and Counterexample III: Divisibility
Mon	Feb 22	4.4	Direct Proof and Counterexample IV: Division into Cases
Wed	Feb 24	10	Graph Theory Arguments
Fri	Feb 26		**Test 3**
Mon	Feb 29	4.5	Indirect Arguments: Contradiction and Contraposition
Wed	Mar 2	4.6	Classical Theorems
Fri	Mar 4		Additional Proof Practice
			Spring Break
Mon	Mar 14	10	Graph Theory Proofs
Wed	Mar 16	5.1	Sequences
Fri	Mar 18		**Test 4**
Mon	Mar 21	5.2	Mathematical Induction I
Wed	Mar 23	5.3	Mathematical Induction II
Fri	Mar 25		**No Class** (Good Friday)
Mon	Mar 28	5.4	Strong Mathematical Induction
Wed	Mar 30	10	Induction Proofs on Graphs
Fri	Apr 1	5.5	Defining Sequences Recursively
Mon	Apr 4		**Test 5**
Wed	Apr 6	5.6	Solving Recurrence Relations by Iteration
Fri	Apr 8	6.1	Set Theory
Mon	Apr 11	6.2	Set Properties
Wed	Apr 13	6.3	Set Proofs and Disproofs
Fri	Apr 15	10	More Graphs
Mon	Apr 18		**Test 6**
Wed	Apr 20		Presentations
Fri	Apr 22		Presentations
Mon	Apr 25		**Review for Final**
Mon	May 2		**Final Exam: 2:00 PM - 5:00 PM**