Math 212: Discrete Mathematics

Spring 2016, 3 credits

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<tr><td>Instructor:</td><td>Scott Summers</td></tr>
<tr><td>Office:</td><td>Halsey Science 220</td></tr>
<tr><td>Office phone:</td><td>1324</td></tr>
<tr><td>Email:</td><td>summerss@uwosh.edu</td></tr>
<tr><td>Office hours (subject to change):</td><td>The shaded boxes represent my office hours:

<table>
<tr><th></th><th>Mon</th><th>Tues</th><th>Wed</th><th>Thu</th><th>Fri</th></tr>
<tr><td>9:10 AM</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>10:20</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>11:30</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>12:40</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>1:50</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3:00</td><td></td><td></td><td></td><td></td><td></td></tr>
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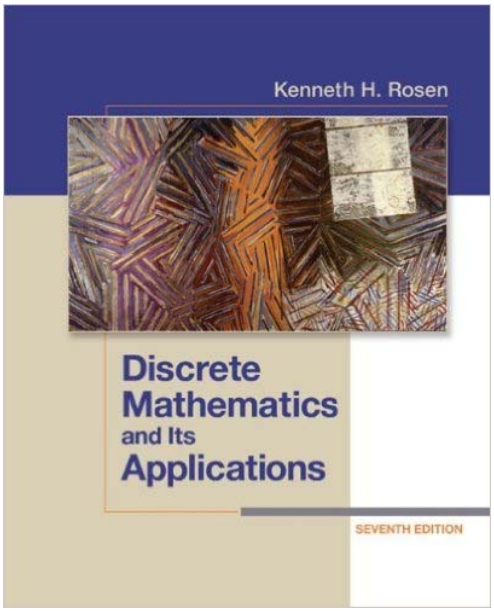
I am also available appointment (send me an email).</td></tr>
<tr><td>Prerequisites:</td><td>CS 221 and Math 171 OR Math 206, all with a grade of C or better.</td></tr>
<tr><td>Textbook (REQUIRED):</td><td>Discrete Mathematics and Its Applications by Kenneth Rosen, 7th edition, ISBN 978-0-07-338309-5.

Here is a picture of what the textbook looks like:
 
</td></tr>
<tr><td>Course description:</td><td>This course focuses on discrete mathematical structures that are essential to computer scientists. In this course, students will develop their analytic and algorithmic thinking skills through practice with propositional and first-order predicate logic, various proof techniques, mathematical and structural induction, sets, functions, sequences, recurrence relations, algorithm analysis and computational complexity, the basics of counting, and an introduction to discrete probability.</td></tr>
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<tr><td>Course website:</td><td>Check the course website on d2l on a regular basis.</td></tr>
<tr><td>Assignments:</td><td>All assignments must be written in LaTeX and the resulting PDF and corresponding source files must be submitted electronically via d2l. It is your responsibility to ensure your submission was submitted correctly. Each assignment must be submitted by the due date (no late submissions will be accepted). All assignments will be weighted equally.</td></tr>
<tr><td>Quizzes:</td><td>You will be given at least one quiz potentially every week. However, during weeks in which an exam is given, there will be no quizzes. Quizzes will be taken at the end of class. Each quiz is equally-weighted. Calculators will not be allowed for any of the quizzes. Quiz material will come from the lecture notes, textbook and assignments.</td></tr>
<tr><td>Exams:</td><td>There will be three, equally-weighted, in-class exams. Calculators will not be allowed for any of the exams. Exam material will come from the lecture notes, quizzes, textbook and assignments. There will be more information about each exam as it approaches.</td></tr>
<tr><td>Grading:</td><td>Your course grade will be based on assignments, quizzes and exams. Your final grade will be computed with the following percentages:

<table>
<tr><td>45%</td><td>Assignments</td></tr>
<tr><td>10%</td><td>Quizzes</td></tr>
<tr><td>45%</td><td>Exams</td></tr>
</table>

If you believe anything was graded incorrectly or unfairly and would like to have it regraded, you must let me know about it within one week of having the item graded. I will regrade the entire assignment or exam and you may gain or lose points.

Grading will be on a plus/minus system. Final grades may be computed based on a curve depending on the overall performance of the class. If no curve is used, then your grade will be computed based on the following:

<table>
<tr><td>A</td><td>A-</td><td>B+</td><td>B</td><td>B-</td><td>C+</td><td>C</td><td>C-</td><td>D+</td><td>D</td><td>D-</td><td>F</td></tr>
<tr><td>92</td><td>90</td><td>88</td><td>82</td><td>80</td><td>78</td><td>72</td><td>70</td><td>68</td><td>62</td><td>60</td><td>0</td></tr>
</table>

In the above table, the number underneath each letter grade represents the lowest percentage you must obtain in order to earn that letter grade.

If you feel that an exam, quiz or assignment was graded incorrectly, notify me in writing before the next class that you would like me to re-grade your exam, quiz or assignment. Then, I will re-grade the entire exam, quiz or assignment and you may gain or lose points.</td></tr>
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Academic dishonesty:	Academic dishonesty of any kind will not be tolerated. All assignments, quizzes assignments and exams are to be completed individually, unless otherwise specified. While discussion of ideas and problems with fellow students is encouraged, all work must be done individually. If you use a book, website or any reference to help you solve a problem, you must cite the reference in your assignment. Any suspected academic dishonesty will be dealt with on a case-by-case basis. Any clarification of what does or does not constitute academic dishonesty must take place **before** you turn in questionable work. For clarification on what constitutes academic dishonesty, contact me or consult the printed policy in the UWO Student Discipline Code, Chapter UWS 14: http://www.uwosh.edu/stuaff/images/student-discipline-code/.
Course outcomes / topic coverage:	1. Students will be able to use the basic principles of propositional and predicate logic to prove logical statements. 2. Students will be able to prove a mathematical statement using the principle of induction (mathematical, strong and structural). 3. Students will be able to prove a mathematical statement using an indirect proof (i.e., proof by contradiction, proof by contrapositive). 4. Students will be able to prove a mathematical statement using a direct proof (i.e., proof by construction). 5. Students will be able to explain the basics of set theory (union, intersection, complement, subset, cardinality, power set, cross product, equality of two sets). 6. Students will be able to explain the basics of mathematical functions (definition, composition, domain, range, inverse, injective, surjective) and relations (definition, equivalence, inverse, composition, partial orderings, and total orderings). 7. Given a recursive algorithm, students will be able to formulate a recurrence equation that describes its running time. 8. Given a recurrence equation that describes the running time of some algorithm, students will be able to solve the recurrence relation, using a standard technique such as iteration or the Master Theorem, in order to derive the running time of the algorithm. 9. Students will be able to explain basic combinatorial principles (combinations, permutations, principle of inclusion-exclusion, pigeonhole principle, binomial coefficients). 10. Students will be able to identify and apply basic probability concepts.