MTH 231: Elements of Discrete Mathematics

Catalog Description: Elementary logic and set theory, functions, direct proof techniques, contradiction and contraposition, mathematical induction and recursion, elementary combinatorics, basic graph theory, minimal spanning trees.

Credits: 4

Terms Offered: F, W, S, Su

Enforced Prerequisites: MTH 112 with C- or ALEKS math placement test: 75% or math placement test: 33, or instructor permission.

Meetings: Three 50-minute lectures and one 50-minute recitation

Course Content:
1. Elementary set theory and functions
2. Basic logic, including quantifiers and DeMorgans Laws for negations.
3. Direct proof techniques
4. Indirect proof techniques of contradiction and contraposition
5. Mathematical induction and recursion
6. Elementary combinatorics, including Sum and Product Rules, permutations, combinations, counting with repetition
7. Basic graph theory, including connectedness and Euler paths
8. Algorithms for obtaining spanning trees, including a proof of the correctness.

MTH 231 Measurable Student Learning Outcomes: A successful student in MTH 231 will be able to:

- Apply basic set operations.
- Use ideas from propositional calculus to understand how to negate and form contrapositives of compound and quantified statements.
- Negate compound and quantified statements and form contrapositives.
- Construct direct proofs (from definitions) of simple statements.
- Learn and apply the Principle of Mathematical Induction.
- Demonstrate an understanding of the construction of indirect proofs by contraposition and contradiction.
- Construct complete explanations for solutions to counting problems.
- Understand and use the matrix representation of finite graphs.
- Use at least one algorithm for finding a minimal spanning tree in a connected graph.

Evaluation of Student Performance: Your grade and measurement of your progress on the course outcomes will be based on weekly online homework, written quizzes, and in-class activities, along with a written midterm and final exam. (Approximate percentages given.)

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Online Homework</td>
<td>15%</td>
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<td>Written Quizzes</td>
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<td>Written Activities</td>
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<td>Midterm</td>
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Students With Disabilities: Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Academic Honesty and Student Conduct: Students are expected to be familiar with the Homework and Exam policies stated in this syllabus, as well as Oregon State University's Student Conduct Code. http://oregonstate.edu/studentconduct/code/index.php.