

Mathematics 271

Discrete Mathematics

(see Course Descriptions for the applicable academic year: <http://www.ucalgary.ca/pubs/calendar/>)

Syllabus

<u>Topics</u>	<u>Number of Hours</u>
Introduction to Proofs	4
Sets and Relations	8
Functions	3
Induction	5
Elementary Number Theory	4
Counting: Permutations, Combinations, Probability	8
Graphs and Trees	4
TOTAL HOURS	36

Course outcomes

To be able to read, understand and write proofs, and to be able to employ basic counting techniques. By the end of this course, students should be able to

1. Distinguish among different types of proofs, including: direct proof, indirect proof, proof by contraposition, and proof by induction.
2. Outline what must be included in the proof of a statement, being aware that this is highly dependent on the statement to be proved.

3. Construct various types of proofs, including: direct proofs, indirect proofs, proofs by contraposition, and proofs by induction.

Subject specific knowledge

By the end of this course, students should be able to

4. Restate all definitions related to the course topics of number systems, sets, functions, relations, and graphs.

5. Restate named theorems covered in the course.

6. List different forms of logical statements and write the negation, the converse and the contrapositive of a statement

7. Perform the Euclidean algorithm to find the greatest common divisor of two integers and to find an inverse of an integer modulo n .

8. List the steps in a direct proof, the steps in a proof by contradiction and the steps of a proof by induction.

9. Produce proofs involving objects covered in the course such as sets, functions, relations, and graphs.

10. Outline and perform the steps required to solve counting problems concerning arrangements of objects and selection of objects.

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Prereq to include Math 213 Fall 2009