Discrete Mathematics for Computer Science I

Web page: `http://web.unbc.ca/~casper/Courses/2006F/141.php`

Prerequisites: Math 12, or MATH 115, or permission of instructor.

Note: Successful completion (C^- or better) of CPSC 141 and CPSC 142 are pre-requisites for almost all CPSC courses. CPSC 141 is a mathematics degree requirement.

Instructor: Dr. David Casperson, **Office:** Lib 471, **Phone:** 960-6672, **e-mail:** `casper@unbc.ca`

Objectives: to provide an introduction to the mathematical language, reasoning and methods; to introduce material used directly in later Computer Science courses; and, importantly, to explain how to reason mathematically.

Times: Lectures are M W F **16:30–17:50** in Room **8-164**. There are no assigned labs or tutorials with this course. Office hours are posted on my door.

Dates:

Homework:	Weekly
Midterm Test:	**Fri, Oct 13**
Thanksgiving:	Mon, Oct 9
Last drop date	Wed, Oct 18
Midterm Test:	**Fri, Nov 3**
Remembrance Day:	Sat, Nov 11
Course Evaluation:	Fri, Nov 24
Final Exam:	3h in 6–18 Dec

Homework: Around eight assignments, approximately weekly. See the CPSC 141 Course Policies for acceptable formats for submission and more information.

Marking Scheme

Homework	20%
1-hour midterms	$2\times 20\%$
3-hour final	40%

Text Books: [1] is **required**. [3] is a useful study guide. [2] has been used in the past for this course.

Syllabus: Most of the material covered comes from [1, Chapters 1–4]. Topics include:

- Propositional Calculus. Connectives and Truth Tables. Logical implication and equivalence. Inverses, converses, and contra-positives. Duality.
- Predicate Calculus. Quantifiers. Negation and simplification of quantified statements.
- Set theory. Sets and subsets. Operations and laws. Operations in terms of predicate calculus. Counting and Venn diagrams. Power sets.
- Mathematical induction. Well-ordered sets. Strong induction.
- Arithmetic. The division algorithm. Prime numbers. GCD's and LCM's. Euclid's algorithm.
- Cartesian products. Relations. Functions. 1-1 and onto functions. Counting functions and relations.
- Languages and Finite State Machines.

The list of topics may not be exactly as shown above.

Cheating: First offenses result in a grade of $-100\,\%$ on the assignment in question and formal notification of the College Dean. Allowing someone to copy your work is cheating. The UNBC Calendar describes academic offenses and possible penalties in more detail. See also the CPSC 141 Course Policies.

References

[1] Judith L. Gersting. *Mathematical Structures for Computer Science: A Modern Treatment of Discrete Mathematics*. W.H. Freeman, New York; USA, sixth edition, 2007. ISBN 0-7167-6864-X.

[2] Ralph P. Grimaldi. *Discrete and Combinatorial Mathematics: an Applied Introduction*. Addison Wesley, fifth edition, 2004.

[3] Seymor Lipshutz and Marc Lipson. *Schaum's Outline of Discrete Mathematics*. Schaum's Outlines. McGraw Hill, second edition, 1997.