

University of Regina
Department of Mathematics and Statistics

MATH 221-001 Introduction to Proofs and Problem Solving
Course Outline, Fall 2006-30

Instructor: Edward Doolittle, Edward.Doolittle@uregina.ca
Web page: <http://www.math.uregina.ca/~doolittl/math221/>
Office: CW 307.19; telephone: 337-3107
Office Hours: MWF 11:30-12:20 and MWF 1:30-2:20 or by appointment

Lecture Time: MWF 10:30-11:20 in LB 235

Textbook: Biggs, Norman L. *Discrete Mathematics*, second edition. Oxford University Press, 2002. We will be covering Part I and Part II (pages 1-156) of the text.

Calendar Description: An introductory course intended to familiarize students with mathematical reasoning and proof techniques. Topics include propositional and predicate logic, sets, relations, functions, and problem solving techniques.

Prerequisites: Mathematics B30 with a grade of at least 80% or a university mathematics course with a grade of at least 60%. Students are expected to have the proper prerequisites for the class. Students without the proper prerequisites may be dropped from the class at any point during the semester.

Course Content: Propositional and predicate logic, sets; proofs using elementary concepts from number theory and arithmetic (based on the definitions of divisibility, prime/composite, even/odd, integer, rational/irrational, positive/negative); proof techniques (contrapositive statements, proof by contradiction, mathematical induction, cases, disproofs, and counterexamples); relations and functions (one-to-one functions, onto functions, and equivalence relations); counting; and modular arithmetic. A detailed course syllabus will be supplied by the end of the second week of classes.

This class is designed to fulfill the needs of students in secondary math education and to bridge the gap between applied math classes such as calculus and the 300 level abstract classes. This is a difficult course and you will find that it requires a great deal of hard work to do well in the course.

Evaluation:

Assignments, weekly (due Wednesdays):	10%
Group work or quizzes, weekly (Wednesdays):	10%
Midterm 1 (Wednesday, October 4):	20%
Midterm 2 (Wednesday, November 8):	20%
Final Exam (Thursday, December 7, 9-12):	40%

Attendance Policy: Regular and punctual attendance provides a foundation for academic success, and is expected of all students. When the persistent lateness or absence of a student jeopardizes the learning or the evaluation of the work of other students in the course, the

student may be subject to penalty, including being dropped from the course or being barred from writing the final examination. One written warning will be provided to the student before such action is taken.

Assignment Policy: Problem sets will be assigned weekly on Wednesdays and will be the basis of quizzes or group evaluations to occur during the class on the Wednesday two weeks after the problem set is assigned. You will find that test and exam questions are similar to and require mastery of the techniques and ideas from the problem sets, making it imperative that you take the problem sets seriously.

Test and Exam Policy: There will be no make-up tests for missed midterms. If you have a legitimate, documented excuse (such as a medical emergency), then the portion of the grade for the missed midterm will be added to the weight of the final exam. Undocumented or insufficiently legitimate excuses for absence from an exam will result in a grade of 0 for that exam. There are no make-up final exams except as (rarely) allowed by your faculty's deferred examination rules.

Special Needs: Any student with a disability who may need accommodations should discuss these with the course instructor after contacting the Coordinator of the Disability Resource Office, RC 251.15, at 585-4631.

Honesty and Integrity: Please refer to section 5.14 of the University of Regina Undergraduate Calendar. In particular, quizzes, tests, and examinations are designed for students to show the instructor how well they have mastered the course material. Work presented on quizzes, tests, and examinations therefore must be the student's own. Academic misconduct is dishonest behaviour or attempted dishonest behaviour which contravenes the general principle of academic honesty and which may include using books, notes, diagrams, electronic devices, or any other aids during a quiz, test, or examination without the explicit permission of the instructor; copying from the work of other students; communicating with others during the evaluation; commissioning or allowing another person to write a test on one's behalf; communicating advance knowledge of an exam to others; and altering answers on a quiz, test, or examination that has been returned. Penalties for academic misconduct will include a grade of 0 on the evaluation in question and referral to the dean's office for further investigation.

Calculator Policy: A calculator will not be necessary for any of the quizzes, tests, or examinations in this course. However, use of a non-programmable calculator from the following list will be permitted on evaluations: Sharp EL510 (recommended), Casio fx-260, or Texas Instruments TI 30X. Use of any other calculator or electronic aid on a quiz, test, or examination without the prior permission of the instructor will be considered grounds for academic misconduct.

All three types of calculators are basically equivalent. All three come in both solar or battery powered versions as indicated by additional letters at the end of the name. For example, the U of R bookstore sells the Sharp EL 510RB (the battery powered model) for \$12.50. The TI 30X comes in both an A and a IIB model. The permitted calculators offer basic arithmetic functions, trigonometric, exponential, logarithmic, and hyperbolic functions, operations with fractions, and basic statistics, have single line display, and single number memory capability. The SHARP EL510 model is approved for use on College Entrance Examinations in the US. The TI 30X is approved for use by the Society of Actuaries for use on actuarial examinations.