VESALIUS COLLEGE August 22, 2003

Syllabus for MTH 111-4: Discrete Mathematics

1. General information

Professor: Dr. Philippe Cara

Office: VUB, building F, floor 10, room 10F733

Telephone: 02 629 33 49 Fax: 02 629 34 95

e-mail: `pcara@vub.ac.be` homepage: `http://homepages.vub.ac.be/~pcara`

Office hours: Wednesday 10.00 – 12.00 and on appointment.

Class meeting times: Wednesday 8.00 – 10.00 in room D.3.11 and Friday 8.00 – 10.00 in room D.3.11. No class on Wednesday September 3rd, Friday September 5th and November 14th.

Textbook: Discrete mathematics and its applications, 5th ed., by Kenneth H. Rosen, McGraw-Hill, 2003. ISBN 0-07-119881-4

WEB site: `http://www.mhhe.com/math/advmath/rosen/r5/`

Prerequisites: None.

Objectives: In this course the student is introduced to mathematical thinking in general. This is done via discrete mathematics after an introduction to logic. Basic and fundamental tools of mathematics are explained and applied. The emphasis is put on understanding the concepts and being able to solve problems using them rather than knowing names and definitions by heart.

2. Testing and grading

Chapter 8 of the Vesalius College Catalog applies.

Papers: Two papers are set during the semester. You have a week to work on them and you have to hand them in yourself at a fixed date and hour (or earlier). The papers should be made with great care. Sloppy work will not be accepted. Papers handed in late are penalized with -25% and refused if more than 24 hours late.

Quizzes: You are expected to study regularly and to make exercises at home. Pop quizzes to be expected!

Active class attendance: Strongly recommended! Worth 10% of the final grade.

Exams: Midterm on Wednesday October 8th, at 8.00 in room D.3.11.

Final exam on Wednesday December 10th, at 8.00 in room _____.

The exams are closed book and closed notes. No calculators are allowed. You cannot pass this course without taking the final exam.

Determination of the final grade:

Active class attendance:	10%
Quizzes:	5%
Papers:	15%
Midterm exam:	30%
Final exam:	40%

Good extra work will be rewarded!

3. Course content and progress

Week 1: Propositional logic (sections 1.1 and 1.2)
Predicate logic (sections 1.3 and 1.4)
Week 2: No class for MTH 111.
Week 3: Proof methods (section 1.5)
Sets (sections 1.6 and 1.7)
Week 4: Functions (section 1.8) and Algorithms (section 2.1)
Complexity (sections 2.2 and 2.3)
Week 5: Elementary Number Theory (section 2.4)
Algorithms for number theory (section 2.5) and Proofs and Conjectures (section 3.1)
Week 6: Summations, sequences and induction (sections 3.2 and 3.3)
Recursion (sections 3.4 and 3.5)
Week 7: Midterm exam
Counting: product and sum rules (sections 4.1 and 4.2)
Week 8: Binomial coefficients (sections 4.3 and 4.4)
Discrete Probability (section 5.1)
Week 9: Conditional probability and expected values (sections 5.2 and 5.3)
Recurrence Relations (sections 6.1 and 6.2)
Week 10: Generating functions (sections 6.3 and 6.4)
Inclusion-Exclusion (section 6.5) and Graphs: introduction (section 8.1)
Week 11: Isomorphism and Connectivity (sections 8.2 and 8.3)
No class on Friday November 14th.
Week 12: Paths and walks (sections 8.4 and 8.5)
Colorings (sections 8.6, 8.7 and 8.8)
Week 13: Trees: introduction and applications (sections 9.1 and 9.2)
Algorithms in trees (sections 9.2 and 9.3)
Week 14: Spanning Trees (sections 9.4 and 9.5)
Questions
Week 15: Final exam