UNIVERSITY OF CALGARY

FACULTY OF SCIENCE

Mathematics and Statistics - MS 476
Ph: (403) 220-5203

COURSE INFORMATION SHEET

FALL 2006

1. **Course**: **PURE MATHEMATICS 427** – *Number Theory*
   Lecture/Time/Session: L01 MWF 12:00
   Instructor(s): R.A. Mollin
   Office/Phone/Email: MS 588 220-7196 ramollin@math.ucalgary.ca

2. **Prerequisites:** Pure Mathematics 315 or consent of the Division.

   NOTE: The Faculty of Science policy on pre- and co-requisite checking is outlined in the current University Calendar (see www.ucalgary.ca/pubs/calendar) *Faculty of Science, section 5C*. **It is the students' responsibility to ensure that they have the pre- and co-requisites for the course, and if they do not they will be withdrawn from the course without notice.**

3. **Fee policy:** After the last day to drop/add courses, there will be no refund of tuition fees if a student withdraws from a course, courses or the session.

4. **Academic Accommodations**: It is the student's responsibility to request academic accommodations. A student with a documented disability who may require academic accommodation must register with the Disability Resource Centre to be eligible for formal academic accommodation. DRC registered students are required to discuss their needs with the instructor no later than fourteen (14) days after the start of this course.

5. **The University policy on grading and related matters** is described in the current University Calendar, *Academic Standings*. In determining the overall grade in the course, the following weights will be used:

In - Tutorial Tests	[5]	50%
Final Exam	[1]	50%

   There will be a final examination scheduled by the Registrar's Office.

6. **Missed Components of Term Work.** The regulations of the Faculty of Science pertaining to this matter are outlined in the current University Calendar, *Faculty of Science, section 6A*. It is the student's responsibility to familiarize herself/himself with these regulations

7. **Academic misconduct** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the current University Calendar under the heading *Student Misconduct* and the information on integrity at. www.ucalgary.ca/honesty

8. **Dates and times of class exercises held outside of class hours (evening tests, Saturday laboratory examinations, weekend field trips, etc.):**
   REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY

   THERE WILL BE NO OUT OF CLASS ACTIVITY SCHEDULED FOR THIS COURSE.

9. **Text**: Fundamental Number Theory with Applications

   Author: R.A. Mollin, Chapman & Hall/CRC Press, Boca Raton, New York, London, Tokyo (1998)

10. In addition to the instruction provided by their lecturer and tutorial instructor, there is a continuous tutorial available where students may obtain individual help with questions about the course material and exercise problems. Faculty members and graduate students will be available in the continuous tutorial room to answer questions in a one-to-one fashion. The location and hours of operation of the continuous tutorial will be announced by the lecturer.

11. **SCUM**
    The Society for Calgary Undergraduate Mathematics is located in MS337A. They sell exam packages, run final reviews, and can often assist with problems. The office is open from 10am to 3pm Monday-Friday, and you are welcome to drop by. They look forward to meeting you!

12. **MIDTERM:** There will be no Mid-Term. The following schedule applies for important class dates, exams and tests:

Department of Mathematics and Statistics
Dr. R.A. Mollin

PMAT 427: L01, MWF @ 12:00 in MS 431

Prerequisite: Pure Mathematics 315 or consent of the Division.

Required Text: **Fundamental Number Theory with Applications**, R.A. Mollin, Chapman& Hall/CRC Press, Boca Raton, New York, London, Tokyo (1998).

Syllabus

Topics

Chapter One — Arithmetic of the Integers: The fundamental laws. Divisibility. Prime Numbers. Applications to Computer Science.

Chapter Two — Congruences: Basics. Linear Congruences. Arithmetic functions. The Chinese remainder theorem. Polynomial congruences.

Chapter Three — Primitive Roots: Order. Existence. Indices. Applications to cryptography.

Chapter Four — Quadratic Residues: Quadratic reciprocity law. Jacobi and Kronecker symbols. Quadratic polynomials and primes. Applications to primality testing.

Chapter Five — Continued Fractions: Finite continued fractions. Infinite continued fractions. Periodic continued fractions. Continued fractions and factoring.

Chapter Six — Diophantine Equations: Sums of squares. The equation $x^2 - Dy^2 = n$. Diophantine equations of higher degree. Elliptic curves, factoring and primality testing.

Tutorials:Tutorials are held each Thursday at 13:00 in SB 105.

Grading: There will be 5 in-tutorial tests worth 10% each, and a final exam worth 50%. There will be no mid-term. The following schedule, applies for the exams and tests:

TEST#	Date	Place	Time
1	September 21	SB 105	13:00
2	October 5	SB 105	13:00
3	October 19	SB 105	13:00
4	November 2	SB 105	13:00
5	November 16	SB 105	13:00

Note that there is no tutorial on Sept. 14th.