



Faculty of Science  
DEPARTMENT OF MATHEMATICS AND STATISTICS  
Course Information Sheet

1. **Course:** PMAT 613 – Fields and Galois Theory  
**Lecture/Time/Session:** MWF, time to be announced  
Fall Term 2004  
Room: to be announced
2. **Instructor:** Dr. C. Cunningham  
**Office:** MS 528  
**Phone:** 220-6888
3. **Prerequisites:** PMAT 511 or permission. The Faculty of Science policy on pre- and co-requisite checking is outlined in the current University Calendar (see [www.ucalgary.ca/pubs/calendar](http://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responsibility to ensure that they have the pre- and co-requisites for the course, and if they do not they will be withdrawn from the course without notice.
4. **Course Web site :** The course web-site address is <http://www.math.ucalgary.ca/~cunning/613/>. Visit this site often as it will contain an updated schedule of lectures, recommended exercises and other information related to the course.

5. **Grading:** In determining the overall grade in the course, the following weights will be used:

a) Class participation:	10%
b) Paper and presentation:	40%
c) Take-home exam:	50%

All grading will use the GPA system, following Faculty of Science guidelines. The University policy on grading and related matters is described in the current University Calendar, *Academic Standings*.

6. **Textbook and syllabus:** Our text is *Galois Theory*, by Garling (Cambridge University Press, 1995); for the most part, we will follow this lovely book quite closely. Please refer to that book and the tentative schedule of lecture below for more detail concerning the course syllabus.
7. **Exercises:** Reflecting topics from lecture, exercises will be posted toward the end of each week of lectures on the course web page and taken up in class after the weekend. *You are expected to have something intelligent to say about at least one exercise at the beginning of each week of lectures.* Your diligence on this matter determines your 'class participation' grade.
8. **Paper and presentation:** At the end of the term you will be asked to submit a short paper, based on a topic chosen in consultation with your instructor. Suggested paper topics are: tests for irreducibility (Garling, Chapter 5); ruler-and-compass constructions (Garling, Chapter 6); algebraic closure (Garling, Chapter 8); simple extensions (Garling, Chapter 13); cubic and quartic polynomials and their Galois groups (Garling, Chapter 14); roots of unity (Garling, Chapter 15); cyclic extensions (Garling, Chapter 16); solution by radicals (Garling, Chapter 17); Lüroth's Theorem (Garling, Chapter 18); elementary symmetric polynomials (Garling, Chapter 19); the Normal Basis Theorem (Garling, Chapter 19); calculating Galois groups (Garling, Chapter 20); The absolute Galois group of a finite field; p-adic fields; extensions of p-adic fields. Your paper is to be presented to your instructor at a mutually convenient time. All presentations are open and students are encouraged to attend presentations by classmates.
9. **Take-home examination:** Toward the end of the course a list of exercises, based on posted weekly exercises, will be posted on the course web site. Your solutions to a certain number of these exercises are to be submitted on 22 December 2004. You are expected to work on these exercises individually.

**10. Tentative schedule of lectures:**

Dates	Topic	Textbook sections	Special announcements
Sept. 01-03	(review: Commutative rings with identity)		Block Week
Sept. 08-10	Fields and field homomorphisms	4.1, 4.2	
Sept. 13-17	Algebraic and transcendental field extensions	4.3, 4.4	
Sept. 20-24	Algebraic and transcendental field extensions	4.4, 4.5	
Sept. 27- Oct. 01	Splitting fields and extension of monomorphisms	7.1, 7.2	
Oct. 04-08	Splitting fields and extension of monomorphisms	7.2, 7.3	
Oct. 13-15	Normal field extensions	9.1, 9.2	
Oct. 18-22	Separable field extensions	10.1, 10.2	
Oct. 25-29	Galois extensions	10.3, 10.4	
Nov. 01-05	Frobenius and inseparable polynomials	10.5, 10.6	
Nov. 08-10	Fixed fields and Galois groups	11.1, 11.2	
Nov. 15-19	The Fundamental Theorem of Galois Theory	11.3, 11.4	
Nov. 22-26	Finite Fields	12.1, 12.2	
Nov. 29- Dec. 03	Finite Fields	12.4, 12.5	
Dec. 06-08	Some infinite Galois extensions		Paper due, presentations
Dec. 13-22	take-home exam		final examination period

- 11. 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.
- 12. 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.
- 13. 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 in the current University Calendar
- 14. Dates and times of class exercises held outside of class hours (evening tests, Saturday laboratory examinations, weekend field trips, etc.):** \*\*Presentations will be held out of class time, at times convenient for the presenter; however, all students are welcome to attend the presentations. \*\*  
**REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY.** If you have a conflict with this out of class time activity, please inform your instructor at least one week in advance of the activity so that other arrangements may be made for you.

Department approval: \_\_\_\_\_ Date: \_\_\_\_\_