MA 3823   GROUP THEORY   TERM B, 2008   SH 203 – MTRF - 3:00PM

Professor Peter R. Christopher   Office: SH 305B   Email: peterrc@wpi.edu
     Office Hours: Tuesday, 2:00pm – 3:00pm
                 Thursday, 11:00am – noon
                 Friday, 10:00am – 11:00am

Assistant: Jon Adler   Office: SH 204   Email: jonadler@wpi.edu
     Office Hours: Monday, Wednesday, Friday, 1:00pm – 2:00pm

Text: Joseph A. Gallian, Contemporary Abstract Algebra, Sixth Edition, Houghton Mifflin.
     See Author's website: www.d.umn.edu/~jgallian

Aims of the Course:
1. To understand the concept of an algebraic system in general, and the notion of a group, in particular. To appreciate the role of abstraction in the context of concrete examples of groups.
2. To sharpen skills such as reading mathematics, problem-solving and proving theorems. Also, to learn to ask good questions, raise conjectures and discover results.

Evaluation:
     Grade averages of 70%, 80%, and 90% guarantee grades of C, B and A, respectively.
     Grades will be determined as follows:

     Three tests totaling 80%. There will be an in-class and a take-home component to each test. You will be allowed to use all non-human resources on the take-home tests, but these tests must be done independently, without communicating in any way with another individual (except me) about any aspect of the tests.

     Quizzes, totaling 5%. These will usually be brief, sometimes announced, sometimes not.

     Assignments, totaling 10%. These will be given on an almost weekly basis, and announced in advance. Unlike the take-home tests, these assignments can be openly discussed with others. In fact, you are encouraged to pass in assignments with two or three names per paper, with the understanding that all parties contribute equally and each contributor understands all of the solutions.

     Participation, totaling 5%. This will be measured in several ways including class discussion, possible presentations, creative questions or answers, and perceived effort. Of course, in order to participate, it helps to be present.

Academic Honesty:
     We will try to make matters pertaining to academic honesty clear to you. If you have any doubt about possibly "crossing the line" please check with me. You are expected to be familiar with the WPI Academic Honesty Policy. See http: //www.wpi.edu/Pubs/Policy/Honesty/Policy.html

Special Needs:
     If you have a disability or medical condition that requires special consideration, let me know. Students in this situation should contact the Disability Services Office (DSO) in Daniels Hall, 508-831-5235.

SYLLABUS

Expectations:

As you can see by the list of suggested problems in the syllabus, much practice is required to gain mastery. Indeed, many of the main ideas of this course are found in the exercises. Additional problems may be assigned and some may be deleted. The student has the responsibility of determining, on a daily basis, the problem sets to be completed and of keeping aware of special assignments and possible changes in the syllabus or in test dates. An average of 2-3 hours of time on homework and review should be invested for each hour of class.

Chapter 0	Preliminaries	p.23	1-4,7,13,16,26,28,36,41,49
Chapter 1	Introduction to Groups	p.37	1,2,3,5,11,13
Chapter 2	Groups	p.53	1,3,5,9,11,13,21,23,25,27,33,34,37
Chapter 3	Finite Groups; Subgroups	p.67	1, 2,5,9,13,17,20,22,25,27,29,33,35,45,49,50a,51
Chapter 4	Cyclic Groups	p.82	1,3,5,7,9,13,15,17,19,23,33,51,57,65
Chapters 1-4	Supplementary Exercises	p.90	1-4,9,11,15,17,19,29,31,33
Chapter 5	Permutation Groups	p.112	1,3ace,5,7,9ace,11,15,17,21,27,35,43,49,54,55

Test 1 – Take-home due: Tuesday, November 11. In-class test: Thursday, November 13

Chapter 6	Isomorphisms	p.132	1-5,7,11,17,23,25,27,29,37
Chapter 7	Cosets and Lagrange's Theorem	p.148	1-5,7,13,15,17,23,27,31,35,37,39,42
Chapter 8	External Direct Products	p.165	1,3,5,7,11,15,21,23,25,41,45,49,57,59
Chapter 5-8	Supplementary Exercises	p.174	1,3,5,6,7,8,10,11,19,21,31,35,37,45
Chapter 9	Normal Subgroups & Factor Groups	p.191	1,3,5,7,15,29,39,41,43,48,49,67,69
Chapter 10	Group Homomorphisms	p.210	3,6,7,8,9,15,19,21,35,39,43

Test 2 – Take-home due: Tuesday, December 2. In-class test: Thursday, December 4.

Chapter 11	Fundamental Theorems of Finite Abelian Groups	p.225	1,5,7,13,17,19,31
Chapters 9-11	Supplementary Exercises	p.230	1,2,7,9,15,17,28

Additional Topics from:

Chapter 24	Sylow Theorems
Chapter 25	Finite Simple Groups
Chapter 27	Symmetry Groups
Chapter 29	Symmetry and Counting
Chapter 30	Cayley Digraphs of Groups

Test 3 – Take-home due: Tuesday, December 16. In-class test: Thursday, December 18.