

Syllabus for Math U575 Spring 2009. Prof. A. Iarrobino

Text: *Contemporary Abstract Algebra*, 6th ed. J. Gallian, Houghton-Mifflin
ISBN: 0-618-51471-8

ClassPac: Will be available from Reprographics (behind bookstore). Worksheets, Sample quizzes, exams, some with solutions.

Prerequisite: Linear algebra Math U371

Time: Monday, Wednesday, Thursday 10:30-11:35 AM. **Room:** 217 Ryder

Instructor: Prof. Anthony Iarrobino, 526 NI, x 5524, e-mail a.iarrobino@neu.edu
(e-mail is usually a very quick way to contact me, please address "Prof. Iarrobino" and also "sign" – indicate clearly who you are as sender.)

Office Hours: Monday 2:30-3:30; Wednesday: 1:45-3:45, Thursday 1:30-3

To talk to someone else: Prof. Alex Martsinkovsky, Undergraduate Director, Mathematics Department, 447 Lake, x 5679, alexmart@neu.edu

Class notes website: Brief synopsis of each class, HW assignments, additional resources, announcements. I plan to update this about twice a week.

<http://www.math.neu.edu/~iarrobino/AIMathU575Spr09classnotes.html>

I plan to use Blackboard or e-mail for occasional announcements.

Grading: Quizzes: about 6, drop the lowest. The average of the quiz grades, together with a contribution of up to one quiz equivalent from Extra Credit HW (see below) and in class participation is 40% of the course grade. A one hour **exam** is 20%. A **Final exam** (day TBA) is required of all, and will count 40%. Optional work such as a **project or presentation:** may be used for up to 20% of your grade, if arranged with instructor and agreed to in writing by Feb. 26.

HW: I will assign homework, primarily from the syllabus below and the Class Pac, and occasionally check it. You may pass your collected HW or notebook in at the final exam for an Extra Credit HW grade, part of the quiz-HW grade. I will pass these back to you at the end.

Classwork, etc. in small groups: We will sometimes work in small groups of 3-4 in class.. We'll discuss how to choose these. You may work on an optional project, or a presentation with other students (as two students preparing and presenting a proof of a theorem). Part of each class will be devoted to solving problems in group theory from the text or that we choose.

Topics: The course introduces the basic ideas and applications of group theory, including symmetry groups, abelian, cyclic, and permutation groups. Also subgroups, normal subgroups, group homomorphisms, quotient groups, direct products, group actions on a set, and (introduction to) Sylow theorems. The theory will be illustrated by examples from geometry, linear algebra and combinatorics. We will cover chapters 1-11, 29 of text, also topics from Chapters 24-27 as time permits.

Goals: A. Students will understand the basic ideas and some applications of groups. Students will be able to explain groups, factor groups as a formalization of properties of symmetry. Students will recognize mathematical objects that are groups, and be able to classify them as abelian, cyclic, direct products, etc. Students will understand homomorphism of and quotients of groups, and be able to determine when a group has a normal subgroup, or a quotient.

B. Students will be able to reason mathematically, to write simple proofs, and are able to judge when an attempted proof in group theory is correct/complete or is not.

C. Students will have a chance to reflect on doing mathematics, solving problems and

our role and progress as mathematicians.

Suggested homework exercises from text (Chaps 0-11).

Chapter 0: 1,2,4,7,8, 9,11,14,18,19,20,49,50.

Chapter 1: 5,9,12,13,17,19,21,22.

Chapter 2: 9,14,15,16,20,22,23,25,32,34,36,37.

Chapter 3: 2,3,10,14,15,16,18,20, 28,29,51,52.

Chapter 4: 1-10,14,21,27,28,49,50,63,64,65.

Supplementary Ex: p. 90: #1-10,17.

Chapter 5: 1-9,17,18,23,24,25,26,27,28,54,55.

Chapter 6: 1-10, 22,23,25,32,33,35.

Chapter 7: 1-9,13,14,16,18,30,31,41,42,43,44,46.

Chapter 8: 1-20,49

Supplementary Ex. p. 174 #5-7,13,14,25-26,50.

Chapter 9: 1,3,4,5,6,8,10,14,15,16,17,18,50,51.

Chapter 10: 5-22,48,53.

Chapter 11: 1-10, 12-20.

Supplementary Ex. p. 230 #1,13,15,19.

Readings: I will assign some readings relevant to Goal C, in particular

W. Thurston, “On Proof and Progress in Mathematics” Bull Amer Math Soc 30 #2, April 1994, 161-177.

Students are invited to suggest others.

Academic Honesty: It is fine to work together to do homework (studies have shown this can be particularly helpful in learning math), provided such assistance is acknowledged specifically in any work passed in, and that you understand what you pass in. Collaboration on quizzes and exams is not allowed, unless I make a specific exemption for a quiz, announced in advance. *In any presentation or project, resources used and sources of assistance must be acknowledged in a professional way.*

Student Code of Conduct: see <http://www.northeastern.edu/osccr/academichonesty.html> or Student Handbook 2007-2008 p. 38-39.

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.”

The website/handbook goes on to detail examples. In Math U575, academic dishonesty on a quiz or exam, or assignment leads to a zero on the quiz or exam or assignment, that cannot be made up, as well as a letter detailing the incident to the Office of Student Conduct and Conflict Resolution. The minimum penalty for a finding of academic dishonesty by the student Judicial Hearing Board includes one year suspended probation.

Incomplete grade: requires a written understanding (contract) between the Instructor and student with details about what material will be made up and how. Incompletes are normally appropriate only for a student who is doing well, but who becomes ill, or has a family emergency late in the semester.