Many people who have never had occasion to learn what mathematics is confuse it with arithmetic and consider it a dry and arid science. In actual fact it is the science which demands the utmost imagination.

–Sofya Kovalevskaya, 1890

By registering for this course, you are agreeing to the terms and policies expressed in this syllabus.

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Meeting times and places: TR 9:25 – 10:40 am; University Hall 2727


It is your responsibility to have a copy of this textbook by the end of the first week of classes.

Prerequisites: Math 248 or the equivalent.

Important Dates: February 25: Midterm Examination I
March 5: Midterm Deficiency Reports Due
March 26: Last day to withdraw or apply for Credit/NoCredit
April 15: Midterm Examination II
May 6: Final Examination

Course Format:
This course will rely heavily on student participation. You will each be required to present homework problems and participate in lectures and in-class group or individual work. It is imperative that you read your textbook and come prepared to participate in class.
Course Description and Goals:
Group theory dates back to the 19\textsuperscript{th} century and plays a central role not only in mathematics but many other scientific fields such as physics, where groups model physical systems such as crystals and various atoms. Group theory is the branch of mathematics that focuses on symmetry and has numerous applications to not only physics but also chemistry. We will consider symmetry groups, permutation groups, matrix groups, as well as abstract groups.

We will cover various sections of chapters 1 – 11 in our textbook, which includes topics such as binary operations, groups, subgroups, cyclic groups, permutation groups, normal subgroups, factor groups, isomorphism, homomorphism, cosets, Lagrange’s Theorem, Cayley’s Theorem, the First Isomorphism Theorem, direct products, and the Fundamental Theorem of Finite Abelian Groups.

Most importantly, this course seeks to:

- Improve your ability to think logically, analytically, and abstractly
- Improve your ability to read, communicate (both orally and in writing), and understand the language of mathematics

Learning Outcomes:
Upon successful completion of this course the student should be able to:

- define and provide examples and non-examples of the fundamental concepts of the course, including but not limited to: groups, subgroups, normal subgroups, factor groups, isomorphism, homomorphism, coset, and direct product of groups.
- state, use, and apply the main theorems of the course, including but not limited to: Lagrange’s Theorem, Cayley’s Theorem, the First Isomorphism Theorem, and the Fundamental Theorem of Finite Abelian Groups.
- formulate conjectures based on patterns and examples.
- better appreciate the role and importance of group theory within mathematics and other scientific fields.
- better appreciate the relationship between algebra and geometry.

Assignments:
Mathematics is not a spectator sport: in order to fully understand the material you need to take time to practice with the ideas, think about the concepts, and work through numerous examples and problems. Working problems on your own is the best way to learn and improve your mathematical skills. I encourage you to discuss the homework with me and your classmates, \textbf{work together on your assignments}, and check your solutions, but I expect that you hand in your own work: \textit{meaning that you write up your solutions independently and in your own handwriting}.

\textit{Please note that representing another person’s work, including the work of an author of a solutions manual, as your own constitutes a breach of academic integrity.}
Homework will be assigned and collected on Tuesdays and Thursdays. Assignments will be posted on my course website. **Homework is due at the beginning of class.** Please write your assignments legibly and **staple** your pages. Write your name on each assignment. **Late homework, which means anytime after the lecture begins, will not be accepted** under any circumstances. Therefore, if you are late to class, or ill and unable to do the assignment, you will receive no credit for your homework. If you know you will miss class due to illness or for some other reason, please give your completed assignment to a classmate or slide it under my office door. Calculators and computers may be used on assignments.

You will not know ahead of time which problems will be graded, so you should give your best effort on all of them!

*Your lowest homework score will be dropped when computing your final grade.*

You should feel free to ask me to review your solutions and provide you with comments. If you are having difficulty with any topic, please see me for help *as soon as possible.*

**Definition/Example Quizzes:**
A quiz will occur weekly during class on Thursdays except for weeks in which there is an examination. **No partial credit will be given on quiz problems.**

The purpose of the quizzes is to ensure you are staying on top of the material and they will consist of definitions and simple examples/non-examples. Knowing precise definitions of mathematical objects is imperative to being able to prove something about them! You may not use calculators, notes, or your text on the quizzes. Make-up quizzes will not be given under any circumstances.

*Your lowest quiz score will be dropped when computing your final grade.*

**Presentations:**
Since one of the goals of this course is to improve your ability to communicate mathematics to others, you will be responsible for presenting your solution to a homework problem at least three times during the semester. I will assign the problems to be presented in the class prior to the presentation. Presentation assignments will be posted on my course website. Your presentation will be graded on a three-point scale:

3 An entirely correct solution.
2 A solution showing strong evidence of conceptual understanding, but perhaps containing several minor computational errors.
1 An attempt at a solution that reveals little evidence of conceptual understanding.
0 No reasonable attempt made to solve the problem.
Your presentation should be aimed at your classmates and not your professor! You should feel free to come see me during my office hours to review your solution with you prior to the date of your presentation. During your presentation, you should explain your reasoning and solution and be prepared to answer any questions that your classmates may have.

**Examinations:**
The final examination occurs on **Thursday, May 6, 2010 from 8 – 11 am in University Hall 2727**. The final exam will be comprehensive. *You must receive a passing grade on the final examination to guarantee that you pass this class.* There will be two in-class midterm examinations during the semester in addition to the final exam. The midterms will take place on: **Thursday, February 25 and Thursday, April 15**. You may not use books, notes, or calculators during these examinations. I will arrange a make-up examination only in a verified extraordinary circumstance. In this case, please see me as soon as possible.

*Please contact me during the first week of the semester if you have a conflict with any of these dates!*

**Expectations:**
The author of your textbook and your professor believe that you can think! Therefore, there will not be a worked example in the text or in class that resembles every homework, quiz, or exam problem. You should expect to spend approximately **two hours outside of class for each hour in class** on this course. I expect that you attend and participate in class, take careful notes, read your textbook, review your class notes, attempt every homework problem, and that you come see me if you run into any difficulties!

**Students with Disabilities:**
If you have a disability (physical, learning, or psychological) for which you are or may be requesting an accommodation, please contact me during the first week of the semester. In addition, you should visit the Disability Support Services Office in the Learning Resource Center located in Daum Hall, 2nd Floor, 310.338.4535. All discussions will remain confidential. Please visit [www.lmu.edu/dss](http://www.lmu.edu/dss) for additional information.

**Grading Policy:**
Your final course grade will be computed as follows:

- Assignments: 25%
- Quizzes: 10%
- Homework Presentations/Class Participation: 5%
- Midterm Examinations: 35%
- Final Examination: 25%
You must receive a passing grade on the final examination to guarantee that you pass this course. I guarantee at least an A- to students scoring 90% or higher, at least a B- to students scoring 80% or higher, at least a C- to students scoring 70% or higher, and at least a D to students scoring 60% or higher. I reserve the right to raise grades higher than this scale dictates, based on considerations such as homework performance, class participation, attendance, and improvement over the semester. Extra credit is not offered in this course.

I will not discuss grading issues via e-mail. If you have questions or concerns regarding your grade, please visit my office hours or arrange a time to meet with me.

Academic Integrity:
Students are expected to abide by the Loyola Marymount University Honor Code as stated in the current Undergraduate Student Bulletin. Please familiarize yourself with the University’s policy regarding academic dishonesty, which can be found on pages 58 – 59 of the 2008 – 2010 Bulletin or at http://www.lmu.edu/about/services/registrar/Bulletin/Academic_Degree_Requirements_and_Policies.htm. Please note that representing another person’s work, including a classmate, the work of an author of a solutions manual, or using information from a website, as your own constitutes a breach of academic integrity. If the instructor concludes that a student has violated the standards for academic integrity established by the University for this course, then she may impose penalties as she deems appropriate to the offense (which can range from receiving no credit for the work in question to expulsion) and shall report the violation to the appropriate parties.

Possible Changes:
If necessary, this syllabus and its contents are subject to revision and YOU are responsible for any changes or modifications announced in class.

Special Requests:
• Please do not put your SSN on anything you give me!
• Please check your e-mail at least once a day! I occasionally will send out announcements, homework hints, etc. via e-mail and would not want you to miss out!
• The use of cellular phones, MP3 players, and other electronic equipment is strictly forbidden during class. The distractions they cause disrupt class. Cell phones must be turned OFF (not left on vibrate) and ear pieces must be removed prior to entering our classroom. If your cell phone rings, if you are seen typing a text message, or if you are seen pushing buttons on an iPod, cell phone, etc., you will be asked to leave the classroom immediately and you will receive no credit for the participation portion of your grade, or any work that was to be done in class, for that day.
• As an LMU Lion, by the Lion’s Code, you are pledged to join the discourse of the academy with honesty of voice and integrity of scholarship and to show respect for staff, professors, and one another.