Advanced Topics in Abstract Algebra  
Loyola University Chicago – Math 315.001 – Fall 2012  
Course Syllabus & Ground Rules

Course Details  
Class Meetings: Cuneo Hall, Room 117; Tu/Th 10:00–11:15 a.m.  
Office Hours: Loyola Hall, Room 302; Tues. 3:00–5:00 p.m. & Wed. 2:00–4:00 p.m.

FINAL EXAM:  
• when: Tuesday, **December 11**, 1:00–3:00 p.m.

Course Texts:  
(Supplemental) Jim Hefferon, *Linear Algebra*, a free text with solutions.

Instructor Coordinates  
Aaron Lauve  
Loyola Hall, Room 302 lauve@math.luc.edu  
773.508.3727 www.math.luc.edu/~lauve

Contact  
Communication by email is preferred. Include 315 in the subject line. Expect a reply within 48 hours.

Course Web Page  
Information and materials relevant to the course are posted at www.math.luc.edu/~lauve/315.html.

Important Dates  
In-term exam dates are tentative. Scheduled dates will be announced at least a week in advance.

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<tr>
<th>Exam</th>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>#1</td>
<td>September 20</td>
<td>Fall Break</td>
<td>10/9</td>
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<tr>
<td>#2</td>
<td>October 30</td>
<td>Thanksgiving</td>
<td>11/22</td>
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<tr>
<td>Final</td>
<td>December 11</td>
<td>Last day to drop with a “W”</td>
<td>November 2</td>
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Requests to reschedule your final exam will be heard only for extenuating circumstances (e.g., three exams in one day is not deemed burdensome enough) and must be made through your Dean’s office.

Course Summary  
SYLLABUS. See gauss.math.luc.edu/info/courses/fall/2012/detail/#10-MATH315 for specifics.  
PREREQUISITE. Math 313 (abstract algebra).

*Why Linear Algebra?*  
Wikipedia’s answer: Linear algebra is central to both pure and applied mathematics. For instance, abstract algebra arises by relaxing the axioms of a vector space, leading to a number of generalizations. Functional analysis studies the infinite-dimensional version of the theory of vector spaces. Combined with calculus, linear algebra facilitates the solution of linear systems of differential equations. Techniques from linear algebra are also used in analytic geometry, engineering, physics, . . . Because linear algebra is such a well-developed theory, nonlinear mathematical models are sometimes approximated by linear ones.
Technology
We will use Mathematica from time to time, as it contains some fairly robust methods from Linear Algebra. Mathematica is *free* for every Loyola University student (myits.luc.edu/mathematica). If you need help installing it, let me know. (You’ll need to log in using your Loyola Network ID.)

Master’s Students
There are master’s students among you. They will be charged with giving presentations on applications of linear algebra and other topics tangential to my lectures. Pay attention, because they will also be assigning exercises that may appear on homework and exams, and because, as described below, there will be short quizzes on the material in the subsequent class periods.

Course Components
HOMEWORK. Students will work and submit homework exercises of two flavors: (1) rote exercises, submitted online at webwork.math.luc.edu/webwork2/; and (2) proof-based exercises, submitted in class. These will be due at the start of class, roughly every week. The lowest two scores of each type will be dropped when computing final grades. Written assignments will be graded on the following criteria:

- **Accuracy (80%).** I hope this is self evident.
- **Neatness & Clarity (10% each).** Practice communicating mathematics.
  
  (N): Write as legibly as you can; if you choose to write in multi-column format, then crease the page down the middle beforehand to give yourself another margin; write on only one side of each page; staple your work together; submit tidy paper (i.e., no crinkles or spiral-bound jaggedness).
  
  (C): Use complete sentences (often) and proper mathematical grammar (always). It takes time to learn how much to say (students say too much as often as not enough). Use the textbook’s examples and proofs as a guide.

Students may work in groups on their homework (preferably groups of three), but each must submit his or her own copy. **Rules for group work:** (i) the names of other group members must be listed below your name; (ii) I will, from time to time and with little forewarning, ask students to defend their answers during my office hours.

QUIZZES. Quick & easy “check your understanding” quizzes will be given on the class periods following a student presentation. Students will need to purchase an Exam Green Book for these quizzes from the Loyola Bookstore. The lowest score will be dropped when computing final grades.

EXAMS. There will be two midterm exams. The final exam will be cumulative.

Course Grade
Course letter grades will be adjusted from the 90/80/70/60 scale as necessary, weighted as below.

\[\text{HW (30\%) + Q (10\%) + EX (2 \times 20\%) + Final (20\%) = 100\%}\]

Disability Services
The Americans with Disabilities Act (ADA) is a federal statute that provides comprehensive civil rights protection for persons with disabilities. It requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please contact the SSWD office: in the Sullivan Center, suite 117, phone 773.508.3700, fax 773.508.3810, or online at www.luc.edu/sswd/.
Getting Help
You are expected to read and comprehend much beyond what is covered in lecture. Use your book well: learn the definitions and theorems; read and understand the proofs; read the examples’ solutions. Please, SEEK HELP if you are falling behind. Form study groups, come to my office hours, find online resources (e.g., ocw.mit.edu/courses/mathematics/18-700-linear-algebra-fall-2005/), read lots of solutions in Hefferon’s text, meet me outside of my office hours, give me feedback, find a tutor, etc.

Escape Routes
At any time, even after the last date for W-dropping the course, students who are experiencing medical or personal difficulties should not hesitate to consult their advisors or the Student Development Office or their dean. Don’t allow yourself to be overwhelmed by such problems; Loyola has resource persons who may be able to help you.

Academic Integrity
The Academic Standards and Regulations web page

www.luc.edu/academics/catalog/undergrad/reg.shtml

outlines the definition and ramifications of cheating at Loyola University (the “Academic Integrity” link) as well as the recourses available to you should you be accused of cheating (the “Academic Grievance Procedure” link). By attending this course, you agree to uphold the high standards of Loyola. If you are found cheating on an exam, you will receive a zero(0) for the exam and the incident will be reported to your academic dean and recorded in your permanent file.

Course Etiquette

Sleeping in class happens and is always forgiven. Reading newspapers or surfing the web is impolite and is a distraction to your instructor; please find a better use for your time. Please set your cell phones to “silent” upon entering class; these are a distraction to everyone. Likewise, talking with your neighbor while I am lecturing is unacceptable.

Finally, and most importantly, respect for others is stressed above all else; please allow me the first chance to answer your fellow students’ questions. I expect everybody to participate in class discussions, but that begins by fostering an environment where we do not hesitate to ask our questions.

Odds and Ends

MAKE-UP QUIZZES/EXAMS. If a real emergency or University-sponsored event arises which prevents you from appearing at a scheduled examination time, you must notify me prior to the next regularly scheduled class (and before the examination if possible). Make-up examinations will be administered only at my discretion. If a student fails to appear for a make-up at the mutually arranged time, no further opportunities will be extended. Failure to contact me as stated above or sufficiently document the extenuating circumstances of your absence will result in a grade of zero on the examination.

LOYOLA EMAIL. On the occasion that I need to contact students outside of class, this is the only sensible way to proceed. If you would rather not use your @luc.edu email account, ... tough! If you are unable to receive my email messages, please let me know.

MORE MATH. The department maintains a BLOG (blogs.luc.edu/mathstats) and a FACEBOOK page (www.facebook.com/lucmathstats) that will contain interesting math/stats related tidbits throughout the semester. Feel free to join the conversation. (Indeed, if there is a topic that you’d like to see discussed, send an email to webadmin@math.luc.edu and we’ll try to get a post up about it.)