COURSE INFORMATION

Math 335  Modern Algebra  Spring 2004

Instructors: Joseph Gubeladze & David Meredith

Lecture: MWF 11:10-12:00, Room: HSS 304

Office: Thornton Hall 941

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Office Hours: MW: 12:30-2:45 pm; occasionally there may be no office hours on Mondays


Prerequisite: (i) Math 325 (Linear Algebra) and (ii) Math. 301 (Exploration and Proof) or instructor’s consent.

Grading Policy:

   (i) Homework (assigned each week on Friday) – 30%,
   (ii) Two midterms – 15% each,
   (iii) Final – 30%,
   (iv) Attendance and punctuality – 10%.

Course Description:

While the share of mathematics in any field of the contemporary science is said to be a measure of maturity of the subject, many mathematicians agree that the share of algebra in this or another mathematical discipline is that of maturity of that discipline. Taking a linear algebra course (Math 325) for the first time, already containing germs of modern algebra, one gets the feeling that it differs in nature from the previous courses. While technically not that involved, linear algebra deals with deep concepts that require simultaneous development of two interrelated skills – abstraction from special examples and application to concrete situations, converting something “visual” into something that can be computed.

In the course Math 335 we will develop in a systematic way the basic algebraic concepts. In very general terms algebra studies structures – i.e. sets whose elements can be added, multiplied, etc. The ubiquity of algebraic structures in science and everyday life is impressive: from logic to numbers, from computers to linguistics, computational biology and algebraic statistics, etc.
We will cover most of the material in the first five chapters in Lang’s book. Certain topics (most of the non-commutative structures) will be omitted and we will enrich Lang’s exposition by as many examples as possible. The topics include:

1. arithmetics in integer numbers
2. groups
3. basics of rings and ideals
4. polynomial rings
5. linear algebra and module theory

This material forms a solid background for further studies in algebra related subjects and it is prerequisite for the upper level undergraduate algebra course, being designed right now in the Mathematics Department, to be offered in the near future. That course will cover such topics as Galois theory, elements of representation theory, Gröbner bases, etc.

The students will have a unique opportunity to witness (and benefit from) a collaboration of two instructors in the same class, leading to a wider variety of techniques to be explored.

Policy:

- Your must be punctual, not disturbing the class by late coming, and cell phones must be switched off during the classes.
- All homework writeups can be done either individually or in groups up to 3 students.
- No late homeworks will be accepted except by permissions prior to the due day.
- If a schedule conflict does not allow you to come to my office hours you should send me e-mail and make an appointment.
- All up-to-date information (including the homework assignment) will be posted on the course page on BLACKBOARD and on J. Gubeladze’s personal page, under the link:
  http://math.sfsu.edu/gubeladze/spring2004/algebra.html