Fall 2010: Math 461/561- Introduction to Lie Algebras and Representation Theory

Instructor: David Hemmer

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Class Meetings: Tuesday, Thursday 11:00-12:20 in 250 MATH

Office Hours: Monday 3-4, Thursday 12:30-1:30 and by appointment

Text: Introduction to Lie Algebras by Erdmann and Wildon. (available much cheaper online compared to the bookstore)

Contacting Dave: Email is probably the easiest way to contact me. If you are unable to make my office hours, please feel free to schedule an appointment or drop by anytime.

Prerequisite: The prerequisite for the course is a B in MTH 309 (or for graduate students in a linear algebra course somewhere.) Understanding of linear algebra is key to learning this material. We will briefly review at the start of the course and at selected other times during the semester as material becomes necessary. Material in Appendix A that is not covered in 309 will be covered during class time. At a minimum you should understand:

- Definition of a vector space and subspace, subspace spanned by vectors.
- Linear independence and dependence, and the definition of basis and dimension.
- Linear maps between two vector spaces, the rank-nullity theorem.
- Writing the matrix of a linear map in terms of given bases.
- Multiplying matrices.
- Definition of determinant and characteristic polynomial

Course Description: This is going to be a fast-paced and fun course, and hopefully everyone will learn a lot of interesting mathematics. My goal is to cover chapters 1-14 of the text, and at least some if not all of the sections from Chapter 15. It is going to be essential to keep up with the reading, including learning the definitions.

Class Website: All course material will be posted on the class website:

http://www.math.buffalo.edu/~dhemmer/461F10.html

There is also a form on the website to leave anonymous feedback about the class.

Homework: The homework assignments in this class will be vitally important, and are worth half of the final grade. I will not in general accept late homework unless prior arrangements have been made. I encourage students to work together on solving the problems, however you must write up your final solutions individually and *be sure you personally understand all the work you turn in.* Simply copying solutions will be dealt with harshly. Homework will usually be assigned every lecture, with both assignments for the week due the following Tuesday. Homework is

worth half of your grade so please take it seriously! With a class this size it is likely that I will only grade a selection of problems each week. Still this will be a lot of effort, so neatly written up and clearly labeled paper will certainly leave me in a better mood!

Quizzes: I will occasionally give unannounced brief quizzes covering definitions or very easy examples. Just like learning a foreign language, it is difficult to master grammar without any vocabulary. Same here, keep up with the definitions and examples!

Exams: There will be a midterm exam sometime around the midterm!

Final Exam: The final exam will be during the usual time scheduled by the Registrar.

Grading: I will determine your final grade out of 600 points as follows:

Quizzes:	100 points
Midterm	100 points
Final Exam:	100 points
Homework:	300 points

No one will receive a final grade lower than the usual grades (i.e. 90-100% A range, 80-89% B range, etc…), although I reserve the right to "curve" grades up. The lowest two homework and lowest two quiz grades will be dropped.