

## Lie Algebras IV 2009

### Information about the course

**1. What is in the course:** The aim of this course is to present the classification of finite dimensional, complex, semisimple Lie algebras. To obtain this classification the course will cover the following topics: Soluble and Nilpotent Lie Algebras, structure theory of Lie algebras, Cartan subalgebras of semisimple Lie algebras, root systems and their classification by means of Dynkin diagrams and the classification of simple, complex Lie algebras. The course assumes knowledge of elementary linear algebra and basic group theory.

**2. Recommended texts:**

This course used the text:

*Introduction to Lie Algebras*  
(Springer Undergraduate Mathematics Series)  
Karin Erdmann, Mark J. Wildon

The Barr Smith Library has two copies of this book one of which is in the reserver collection.

There are many other books covering the material and the standard one is:

*Introduction to Lie Algebras and Representation Theory*  
(Springer Graduate Texts in Mathematics)  
James E. Humphries

which is pitched at a slightly higher level. There are also some free things you can download from the web — see my web page below.

**3. Pre-requisites:** Algebra II would be sufficient background material. Some of the ideas in Groups and Rings III would be helpful but not necessary.

**4. Lecture times:** Lectures are scheduled for Wednesday 11.10 in Schultz 308a and Friday at 12.10 in EM213. After the first lecture I will hold all lectures in the School Board Room unless otherwise notified. Please keep an eye on your email in case someone else in the School wants the Board Room and I have to revert to the locations above.

**5. Email and the web:** I will use email a lot. I will collect email addresses in the first lecture and I will assume that you are **receiving** and **reading** my emails.

Anything I handout, and some additional material, will be on the course web page at

<http://www.maths.adelaide.edu.au/michael.murray/1a09/1a09.html>.

**6. Assessment:** There will be  $n$  assignments and a final 3 hour exam. The final mark is calculated as follows. Let  $e$  be the mark for the exam out of 100 and  $a$  the mark for the best  $n - 1$  assignments out of 20 then the final mark out of 100 is:

$$\max \left\{ e, \frac{80}{100}e + a \right\}.$$

**7. Contact details.** You can find me on Level 4 of 10 Pulteney St in Room 4.19. The phone there is 8303 4174 and my email is [michael.murray@adelaide.edu.au](mailto:michael.murray@adelaide.edu.au).

Professor Michael Murray  
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