

NCSU Mathematics Department

MA 792J-002 – Representations of infinite-dimensional Lie algebras

Spring 2009, MWF 2:30-3:20 pm, HA 272

Instructor: Dr. Bojko Bakalov, office HA 138, phone 513-7442,
email bojko_bakalov@ncsu.edu

Course Webpage: <http://www4.ncsu.edu/~bnbakalo/MA792J.html>

Office Hours: MF 1:30-2:25, W 3:20-4:00 or by appointment, in HA 138.

Course Description: This course is a follow-up to MA 720 and is complementary to MA 725. Infinite-dimensional Lie algebras have connections and applications to diverse areas of mathematics and physics such as: combinatorics, group theory, number theory, soliton equations, quantum field theory, and string theory. The Lie algebras we will discuss include the Heisenberg, affine Kac-Moody and Virasoro algebras, as well as the Lie algebra of infinite matrices. We will investigate their representations and characters, and point out connections to combinatorial identities and modular functions.

Prerequisite: Lie algebras (MA 720).

Text: *Bombay Lectures on Highest Weight Representations of Infinite Dimensional Lie Algebras*, V.G. Kac and A.K. Raina, World Scientific, 1987, ISBN-13: 978-9971503963

Homework will be assigned regularly and will be collected every Friday at 2:30 pm. Collaboration on the homework is allowed but everyone should write their own solutions. Selected problems will be discussed in class.

Presentation: At the end of the course every student will have to give a presentation on a topic related to but not covered in the lectures. The topics will be chosen about a month in advance with the help of the instructor.

Grade will be based on the homework (50%), presentation (40%), and attendance and class participation (10%).

Attendance: Students are expected to arrive on time, to contribute to group work and class discussions, and to stay until the class ends. Attendance at all meetings of the class is expected and will be recorded. Occasional absences will be approved if they meet University policies (see http://www.ncsu.edu/policies/academic_affairs/pols_regs/REG205.00.4.php).

Adverse Weather: Announcements regarding scheduled delays or the closing of the University due to adverse weather conditions will be broadcast on local radio and television stations and posted on the University homepage.

Cell Phones: Pagers, cellular phones and other types of telecommunication equipment are prohibited from use during class. Make sure that any pagers, phones or other equipment are turned off during the class period. If you have a special need to have your pager or phone on during class, please let me know.

Academic Integrity Statement: Students are required to follow NCSU policy available at http://www.ncsu.edu/policies/student_services/student_discipline/POL11.35.1.php. *“Academic dishonesty is the giving, taking, or presenting of information or material by a student that unethically or fraudulently aids oneself or another on any work which is to be considered in the determination of a grade or the completion of academic requirements or the enhancement of that student's record or academic career.”* (NCSU Code of Student Conduct). The Student Affairs website has more information (http://www.ncsu.edu/student_affairs/osc/AIpage/acaintegrity.html).

Statement for Students with Disabilities: Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disabilities Services for Students (http://www.ncsu.edu/provost/offices/affirm_action/dss). For more information on the NCSU policy on working with students with disabilities, see http://www.ncsu.edu/provost/hat/current/appendix/appen_k.html

Class Evaluations: Online class evaluations will be available for students to complete during the last two weeks of class. Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any particular instructors.