Math 651: Complex Lie Groups and Geometry **Spring 1998**

Syllabus

Jan. 14	Lie groups	
16	Semi-direct products	
19	Subgroups	
21	Universal cover	
23	Lie algebras	
26	Adjoint representations	
28	Exponential map	
30	Logarithm and Campbell-Hausdorf formulas	*Assignment 1*
Feb. 2	Solvable, nilpotent, semi-simple	
4	Levi-Mal'cev, complete reudcibility	
6	Lie's Theorem	*Assignment 2*
9	Killing Form, Cartan's criterion	
11	Intro to classification of semsimple, reps of SL_2	
13	Representations of sl_2	
16	Consequences of sl_2 reps for roots and root spaces	
18	Root systems, examples in rank 2 and 3	
20	Properties of root systems	
23	Simple roots, Dynkin diagrams, and their classification	
25	Recovering a Lie algebra from a Dynkin diagram	
27	The classical root systems and Lie algebras	
Mar. 2	Fundamental dominant weights and simple reflections	
3	Weyl chambers and transitivity of Weyl group	
5	Length and index	
5–13	**Midsemester Break**	
16	The classical Weyl groups	
18	Weights of a representation	
20	Calculating Weyl group orbits	
23	Weyl character and dimension formula	
25	Constructing subalgebras and subgroups from roots	
27	Parabolic subalgebras and subgroups	
30	Homogeneous spaces and group actions	
Apr. 1	Complex structure on G/H	
3	Equivariant fibrations	
6	Normalizer fibration, holomorphic reduction	
8	Albanese fibration; compact complex Lie groups	
10	*Easter Break*	
13	*Easter Break*	
15	Equivariance theorem, compact parallelizable	
20	Wang's theorem	
20	Borel-Remmert Theorem	
22	Equivariant imbeddings into $\mathbf{P}^n$	
27	Homogeneous line bundles	
29	Imbedding S/P	
22	Borel-Weil Theorem	
May 1	Study Day	