Department: Mathematics and Computer Sciences
Division: Pure Mathematics
Level and Major: Graduate

Course Title: Lie Group and Lie Algebra
Number of Credits: 3
Prerequisite:
Lecturer:

Course Description:

Course Goals and Objectives:

Course Topics:

- Definition of lie groups and lie algebras and examples
- Subgroups and production of lie groups and homomorphism between lie groups
- Left and right invariant vector fields and associated lie algebras and exponential map
- Action of lie groups on manifolds and invariant and fundamental vector fields
- Adjoint action on lie groups
- Invariant forms and Harr measure and invariant metrics
- Homogeneous spaces
- Covering spaces
- Representation of lie groups and lie algebras
- Irreducible representation and theorems
- Universal algebra associated to a lie algebra
- Nilpotent and solvable lie algebras
- Semi simple lie algebras and their representations
- Cartan subalgebras and Killing forms
- Roots in semi simple lie algebras
- Weights in representations of semi simple lie algebras

Reading Resources:

Evaluation: