COURSE CONTENTS

1. INTRODUCTION
   
   - Summary of basic differential geometry.
   - Vectors fields and differential forms.

2. DE RHAM COHOMOLOGY
   
   - Integration of manifolds. Stokes’ theorem.
   - A quick introduction to De Rham cohomology.

3. FROBENIUS THEOREM
   
   - Flows of vector fields.
   - Lie derivative and Lie bracket.
   - Distributions, integrability and Frobenius’ theorem. Foliations.

3. LIE GROUPS
   
   - Lie groups and their Lie Algebras. Examples.

4. RIEMANNIAN GEOMETRY.
   
   - Riemannian manifolds. Examples.
• The Levi-Civita connection. Covariant derivative. Parallel fields.
• Geodesics. The exponential map. Convex neighbourhoods.
• The curvature tensor. Sectional curvature. Examples.
• Jacobi fields. Conjugate points.
• Hopf-Rinow and Hadamard theorems.
• Spaces of constant curvature. Cartan’s theorem.
• Curvature and topology (if time permits).

Bibliography