



**UNIVERSIDADE FEDERAL DE SANTA CATARINA  
CENTRO DE CIÊNCIAS FÍSICAS E MATEMÁTICAS  
PÓS-GRADUAÇÃO EM MATEMÁTICA PURA E APLICADA**

**MTM510054 Riemannian Geometry**

Pre-requisite: MTM410051 Differentiable Manifolds

Weekly lesson hours: 06h

**Discipline syllabus:** Riemannian Metrics. Connection of Levi-Civita. Geodesics. Exponential Application. Normal and Convex Neighborhoods. Covariant Derivation of Tensors. Curvature Tensor. Fields of Jacobi. 1st and 2nd Variation of the Functional Length and Energy. Conjugated points. Bonnet-Myers Theorem. Isometric immersions: Gaussian and Codazzi equations. Complete Riemannian Varieties: Hopf-Rinow's Theorem and Hadamard's Theorem. Constant curvature spaces. Comparison theorems for Sectional and Ricci Curvatures.

**BIBLIOGRAPHIC REFERENCES**

1. Do CARMO, M. P. - Geometria Riemanniana, Rio de Janeiro, IMPA, Projeto Euclides, 1979.
2. CHEEGER, J., EBIN, D. - Comparison Theorems in Riemannian Geometry, Amsterdam, North-Holland, 1975.
3. O'NEILL, B. - Semi-Riemannian Geometry with applications to Relativity, New York, Academic Press, 1983.
4. PETERSEN, P. - Riemannian Geometry, Graduate Texts in Mathematics, Springer-Verlag, 2006.