

Math 546
TOPICS IN RIEMANNIAN GEOMETRY II ;
Riemannian Geometry and Holonomy Groups
SPRING 2006

Instructor: Dr. Jae-Hyook Lee, Cupples I (207A), 5-4208, email: jhlee@math.wustl.edu

Time and Location: Cupples I 199 M-W-F- 12:00PM 1:00PM

Office Hours: M-W-F- 11:00AM 12:00PM

Reference books: *Riemannian Geometry and Holonomy Groups* by Simon Salamon.
Einstein Manifolds by Arthur L Besse.

Further References : <http://arxiv.org/abs/math.DG/0406011>

<http://euclid.ucc.ie/pages/staff/Mckay/Talks/g2.pdf>

http://www.archive.org/details/lecture_10249 ; In fact, a series *Holonomy I-IV Geometry of Characteristic Classes* by Shigeyuki Morita

Material: Seeing or touching manifolds are the best ways to know the shape of manifolds, even though we can't do most of cases. One of possible indirect ways to touch manifolds is parallel transformation along a Riemannian manifold and it relates geometric information on the manifold to an algebraic one called holonomy group. Therefore, holonomy groups and their representation are deeply related geometric structure of the manifolds. These relations and Berger's classification of holonomy groups are what we study in this course. This course also covers a range of topics in Riemannian geometry along with the Berger's list.

For the background material, the representation theory of Lie groups and Lie algebras plays a important role and some bundle theory on Riemannian manifolds are also necessary. These will be covered as another main issues.

Assignments: There is no test but students who register are expected to deliver a short talk. The topics of talks are up to the students but a list of recommended topics is also available.