McGill University
Department of Mathematics and Statistics

MATH 577 (Geometry and Topology II)
COURSE OUTLINE – Winter Semester 2016

Instructor: Dr. Pengfei Guan (Burnside Hall 918),
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Office hours: Tuesday and Thursday 13:00-14:00, or by appointment.
Course Webpage: http://www.math.mcgill.ca/guan/courses/m577.html

Textbook: There will not be a fixed textbook.

References:

(1) *An Introduction to Differential Manifolds and Riemannian Geometry* by W. M. Boothby, Revised 2nd ed. (Academic Press)
(2) *Differential Forms in Algebraic Topology* (Springer-Verlag), by Bott and Tu.
(3) *Riemannian Geometry* (Springer-Verlag) by Do Carmo

Course Outline: The main topics are manifolds and differential forms, De Rham's theorem, connections and curvatures in Riemannian geometry.

(1) *Differential Manifolds:* Implicit and Inverse Function Theorems, submanifolds, Lie groups, vector fields on a manifolds, Frobenius Theorem.
(2) *Tensor on Manifolds:* Tangent covectors, Riemannian metrics, tensor fields, exterior differentiation.
(3) *Integration on Manifolds:* Stokes' Theorem for manifolds, homotopy of mappings, De Rham theorem.
(4) *Riemannian Manifolds:* Connnections, geodesics, normal coordinates, notions of curvatures.

Assignments: There will be 5 assignments.

Middle Term Test: March 8, 2016.

Final Examination: to be scheduled during the final exam period of April, 2016.

Marking System: Assignments 40%; Tests 20%; and Final Examination 40%.

Note: In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Academic Integrity: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/integrity for more information).

Assignment Plagiarism: Assignments must be done individually. You may not copy another person's work. Furthermore, you must not give a copy of your work to another student.