

McGill University
Department of Mathematics and Statistics

MATH 380 (Honours Differential Geometry)
COURSE OUTLINE – Winter Semester 2013

Instructor: Dr. Pengfei Guan (Burnside Hall 918),
Telephone: 514-398-3806,
Email: guan@math.mcgill.ca
Office hours: Tuesday & Thursday 1:30pm-2:30pm, or by appointment.
Course Website: <http://www.math.mcgill.ca/guan/courses/m380/m380.html>

Textbook: *Differential Geometry of Curves and Surfaces* by Manfredo Do Carmo, Prentice Hall.

References:

- (1) *Global Differential Geometry*, by S. S. Chern (Mathematical Association of America)
- (2) *Modern Differential Geometry of Curves and Surfaces*, by Alfred Gray, (CRC; 2 edition).

Course Outline: The course covers local as well as global differential geometry of curves and surfaces. The main topics are

- (1) *Local theory of plane and space curves and the Frenet formulas.*
- (2) *Local theory of surfaces: the first and second fundamental forms, Gauss map, the shape operator.*
- (3) *Ruled surfaces and minimal surfaces.*
- (4) *Intrinsic geometry of surfaces, the Gauss Theorem.*
- (5) *Geodesics, exponential maps, Fundamental Theorem of Surfaces.*
- (6) *Global theory of curves: total curvature, the Fary-Milnor theorem.*
- (7) *Global theory of surfaces, the Gauss-Bonnet theorem, the Hopf-Rinow Theorem.*

Assignments: There will be six assignments, due on following days by 5:00pm: Jan. 28, Feb. 11, 25, March 18, April 1, April 15. *NO LATE ASSIGNMENTS WILL BE ACCEPTED.*

In-Class Middle Term Test: Feb. 28.

Final Examination: to be scheduled in April.

Marking System: Assignments 20%; Tests 20%; and Final Examination 60%.

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.