

THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MATH 4030 (First term, 2019-20)
Differential Geometry
Course Outline

Course Description

This is a first course on differential geometry at the advanced undergraduate level. It focuses on the basic theory of curves and surfaces in three dimensional Euclidean space. Topics to be covered include local and global theory of plane and space curves, regular surfaces in \mathbb{R}^3 , the intrinsic and extrinsic geometry of surfaces, various notions of curvatures, concepts of parallel transport, covariant derivative and geodesics, local and global aspects of differential geometry including Gauss-Bonnet theorem. We assume as prerequisite a solid understanding of linear algebra (at the level of MATH2040), multivariable calculus (at the level of MATH2010 and 2020) and point-set topology (at the level of MATH3070). Knowledge on differential equations (at the level of MATH3270) and complex analysis (at the level of MATH2230) will be helpful on some specific topics.

Instructor

- LI Man-chun Martin (Office: LSB 236. Email: martinli@math.cuhk.edu.hk)

Teaching Assistants

- CHEN Shanjiang (Office: LSB 222A. Email: sjchen@math.cuhk.edu.hk)

Time and Venue

- Lectures: Tuesdays 8:30am-10:15am at LSB LT4, Thursdays 9:30am-10:15am at LSB C2
- Tutorials: Thursdays 8:30am-9:15am at LSB C2

Assessment Scheme

- **Homework:** 10%
There will be six homework assignments. The lowest homework score will be dropped.
- **Midterm:** 30%
There will be one midterm, details of which will be announced on the course webpage. No make-up midterms will be given unless under very special circumstances with proof of evidence.
- **Final Examination:** 60%
The final examination will be centralized by the University.

Course Webpage

Please check regularly the following course webpage for course materials and announcements:

<http://www.math.cuhk.edu.hk/course/1920/math4030>

Textbook

We will cover selected parts of the following book:

- Manfredo do Carmo, *Differential Geometry of Curves and Surfaces*, Prentice Hall, 1976