THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MATH 6021 (First term, 2020-21)
Topics in Geometry I
Course Outline

Course Description

This is a graduate level topics course on geometry. This term we will focus on the theory of minimal surfaces and their applications. After discussing some foundations like first and second variation formula, Bernstein theorems and curvature estimates, we will discuss the existence and regularity theory for minimal surfaces. Depending on the time available, we will also cover the geometric applications and some recent developments on the min-max theory for minimal surfaces. The goal is to understand the analytic and geometric aspects of minimal surfaces and their applications in global geometry and topology. We shall assume as prerequisite a solid understanding of Riemannian Geometry (at the level of MATH5061), as well as a working knowledge on partial differential equations (at the level of MATH5022) and real analysis (at the level of MATH5011).

Instructor

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

Time and Venue

- Lectures: Mondays 9:30am-12:15pm online via ZOOM
- ZOOM meeting ID and passcode will be sent to you by email. If you are not registered in the course but would like to attend to the online lectures, please contact the instructor by email.

Assessment Scheme

- **Final Essay/Presentation**: 100%

  You have to submit a mathematical essay on a proposed topic by the end of the semester. There is no prescribed length for the essay, but a reasonable range is something between 5000-8000 words. The deadline to submit the essay (by email) is **December 14, 2020**. One week before the submission deadline, i.e. during the lecture time on **December 7, 2020**, you will give a 15-minute presentation (via ZOOM) for an overview of the content of your essay. Some suggested topics for the essay and other details will be announced during the first few weeks of the semester.

Course Webpage

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

`http://www.math.cuhk.edu.hk/course/2021/math6021`

Textbook and References

Some of the topics that I am planning to cover can be found in the book:

- Tobias Colding and William Minicozzi II, *A Course in Minimal Surfaces*, AMS Graduate Studies in Mathematics Vol. 121

Additional references will be given throughout the lectures as necessary.