C o u r s e   D e s c r i p t i o n

Department of Mathematics

Nature of the course ☐ required ■ elective	Area ☐代數與數論 ☐分析 ■ 幾何與拓樸 ☐計算與應用數學 ☐機率 ☐統計 ☐離散數學 ☐其他 ☐論文研討、獨立研究			
Calculus	☐Calculus A ☐ Calculus B			
Course number		Section number		Number of credits	3
Course title	度量幾何 Metric geometry			
Instructor	王文才			

＊Contents：

Much of differential geometry is actually metric in nature, and the return to study more synthetic approaches has led to great advances in understanding, besides being interesting in its own right. For example, one often needs to consider a sequence of manifolds and pass to some sort of limit, but although the limit might not be smooth, many geometric notions such as curvature, volume, geodesics, etc. can often be defined.

Topics to be included are: Length spaces, spaces of curvature bounded above, spaces of curvature bounded below, first and second variation formulae, Toponogov's theorem, semiconvex functions, limits and convergence of metric spaces, tangent cones, Hausdorff and rough dimension. Depending on time and interests of the class, further topics may include large-scale course geometry, analysis on metric-measure spaces.

＊Course prerequisite：

undergraduate analysis or advanced calculus, and some familiarity with the definition of smooth

manifolds. Differential geometry I course is sufficient.

＊Textbook：

A Course in Metric Geometry , by Burago, Burago, Ivanov.
[Graduate Studies in Mathematics, ISBN: 0-8218-2129-6]

Additional references may be supplied later

＊Grading scheme：

Problems sets: 100%

＊Course Goal:

Study geometry, primarily by means of metric distance function.