Course Description

Department of Mathematics

Nature of the course ☐ required ■ elective		Area 麻煩老師勾選類別，或直接填寫＿＿＿＿＿＿＿＿。 ☐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	免填	Number of credits	3
Course title	課程名稱： 基礎數學(一)				
Instructor	教授： 康明昌				

I. ＊**Contents**：

The main themes of this course will be focused on linear algebra, differential equations, and projective geometry.

This is a course designed for students who are not mathematics majors. Students of mathmatics are discouraged to take this course.

We will discuss the interplay between differential equations and linear algebra. Then we will study some basic notions of linear algebra, differential equations, and projective geometry, such as vector spaces, simplifying linear transformations, application of linear algebra in solving differential equations, collineation transformations, some classical theorems in projective geometry. We will discuss some history of mathematics in the 19-th century so that students get some ideas about the contribution of several mathematicians in this period, e.g. Jordan, Weierstrass, Frobenius, Poncelet, etc.

Projective spaces will be introduced via synthetic and analytic methods so that it will not be too abrupt for students who understand geometry only from the plane Euclidean viewpoint. Complex projective spaces will be mentioned and we will try to convince students that, even in geometry, working on the complex numbers is superior to working on the real numbers (although it is not intuitive to visualize complex figures).

II. **Course prerequisite**：

Two-semester course on calculus and at least one-semester course on linear algebra (or its equivalent).

III. ＊**Reference material** (**textbook**(**s**))：

Garrity, All the mathematics you missed.

Graham, Knuth and Patashnik, Concrete mathematics.

Samuel, Projective geometry.

IV. ＊**Grading scheme**：請填寫各項計分之百分比，例如：期中 30% 期末 40% 作業 10% 報告 20%，總計 100%

Report 70%, attendance 30%.

V. **＊Course Goal：**

We hope the students will understand how linear algebra arose in the study of differential equations. Moreover, we will help students to understand projective spaces through the language of linear algebra.

1. ＊號為必填欄位
2. 大綱內容字數英文最少 200 字以上