

Course Description

Department of Mathematics

Nature of the course <input type="checkbox"/> required <input checked="" type="checkbox"/> elective		Area <input checked="" type="checkbox"/> 代數與數論			
Course number		Section number	免填	Number of credits	3
Course title	課程名稱： Introduction to coding theory and algebraic geometry				
Instructor	教授： 余正道				

I. ***Contents :**

Coding: Error-correcting code, linear code, Goppa code, coding systems from algebraic curves.

Algebraic geometry: Curves, linear system, Riemann-Roch, Weil bound, curves with many rational points.

II. **Course prerequisite :**

Undergraduate Algebra

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

van Lint and van der Geer, Introduction to coding theory and algebraic 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%

Homework 50%

Oral or written presentations 50%

V. ***Course Goal :**

This course introduces the application of algebraic geometry to coding theory. On one hand, coding theory involves the concrete question of finding good codes, which is easy to understand and is practically important. On the other hand, algebraic geometry provides a powerful tool to construct ample examples of good codes. This course tries to balance the two objects by introducing basic concepts of coding theory in the first part and then introducing curves over finite fields and related basic algebraic geometry with applications to coding theory. We hope in this way, students will find algebraic geometry more accessible and useful. Students from different areas, e.g., from engineering or science are all welcome to attend this course. Some familiarity with algebra is required.

1. *號為必填欄位
2. 大綱內容字數英文最少200字以上