

淡江大學九十七學年度第二學期課程教學計畫表(格式二)

壹、科目名稱：常微分方程。

貳、授課老師：楊定揮。

參、開課系所班級：數學系碩士班一年級數學組。

肆、必選修：選修。

伍、學分數：3。

陸、先修科目：線性代數，高等微積分。

柒、教學內容及進度：

1. Stability of Nonlinear Systems

- Definitions and Linearization
- Saddle Point Property: Stable and unstable manifolds
- Orbital Stability

2. Method of Lyapunov

- An Introduction to Dynamical System
- Lyapunov Functions
- Simple Oscillatory Phenomena

3. Two Dimensional Systems

- Poincare-Bendixson Theorem
- Levinson-Smith Theorem
- Hopf Bifurcation

4. Second Order Linear Equations

- Sturm's Comparison Theorem and Sturm-Liouville Boundary Value Problem
- Distributions
- Green's Function
- Fredholm Alternative for 2^{nd} Order Linear Equations

5. The Index Theory and Brouwer Degree

- Index Theory In The Plane
- Brief introduction to Brouwer degree \mathbb{R}^n

6. Introduction to Regular and Singular Perturbation Methods

- Regular Perturbation Methods
- Singular Perturbations : Boundary Value Problems
- Singular Perturbation : Initial Value Problem

捌、 授課方式：課堂講授。

拾、 教材課本：Sze-Bi Hsu, *Ordinary Differential Equations with Applications*, World Scientific Press, 2006.

拾壹、 參考書籍：Lawrence Perko, *Differential Equations and Dynamical Systems*, Springer

拾貳、 成績考核方式：

平時成績	50%
考試成績	50%