課程名稱:微分方程 I (Differential Equations I)

課號/班別: MA8017

上課時間 (Time): Wednesday 13:00-15:50

學分: 3

授課教師: 陳建隆 (Jann-Long Chern)

參考書(References):

(1) Sze-Bi Hsu, Ordinary Differential Equations with Applications: Second Edition

(2) J. D. Murray, Mathematical Biology Vol I-II

(3) Related Notes

授課內容:

The objects of this course are the followin:

(1) Study the basic mathematical models coming from the fields of Biology, data science and physics, etc.

(2) Learn the fundamental theorems of ODE

(3) Investigate the principles of stability

(4) Further topic of the related Dynamical Systems and Patterns

In this course, we study the following contents:

(1) The Basic mathematical models coming from the areas of Biology, physics, data science, image processing, etc.

(2) Differential equations of the first order, linear systems of ordinary differential equations:

(3) Linear System with constant and periodic coefficients, Floquet theory;

(4) Phase plane analysis for 2-D autonomous system;

(5) Stability of Nonlinear Systems, Elementary qualitative properties of nonlinear differential equations;

(6) Method of Lyapunov Functions;

(7) Poincare-Bendixson Theorem and Two Dynamical Systems.

(8) Related applications of ODEs.

評量配分比重:

Report Exercises and homes works + Quiz and Exams.

Office Hours: M312, Monday 3-5 PM or Make point with Teacher first