

Course Title: Differential Equations I

Course Number: MA8017

Instructor: Jann-Long Chern

OFFICE HOUR: Wednesday, 4:00-5:00 PM

(1) Course Objective: The object of this course includes:

- (a) Study the basic model of Ordinary Differential Equations (ODE)
- (b) Study the fundamental theorems of ODE
- (c) Introduce and Investigate the principles of Stability; Periodic Solutions and Related Theorems.
- (d) The Related topics of ODE and Dynamical Systems

(2) Course Description:

Introduction;
Fundamental Theory;
Differential equations of the first order;
Linear systems of ordinary differential equations:
Linear System with constant and periodic coefficients;
Stability of Nonlinear Systems; Floquet theory;
Two-Dimensional System; Dulac Q., Omega limit sets and Invariant sets,
Poincare-Bendixson theorem,
Method of Lyapunov Functions;
2nd Order Linear Equations;
*Elementary qualitative properties of nonlinear differential equations;
*Introduction to Perturbation Methods

(3) Textbook/References:

- (A) Sze-Bi Hsu: Ordinary Differential Equations
- (B) Jack Hale: Ordinary Differential Equations

(4) Grading:

- (1) Homeworks and Reports (40%)
- (2) Tests and Mid-Term Exam. (30%)
- (3) Final Exam (30%)