數學系課程核心教材內容

課程名稱：(中文）微分方程(一) (英文）Introduction to Ordinary Differential Equations(I)				開課單位	學士班
				課程代碼	2102201
學分數	3	必/選修	必	開課年級	二
教學目標：常微分方程簡介及其基本類型及解法 課程概述：線性常微分方程、特殊二階微分方程、線性系統 先修科目或先備能力：微積分(一)(二)					
建議參考書目	Elementary Differential Equations and Boundary Value Problems. By W.E. Boyce and R..C. DiPrima.				

課程大綱

單元主題	內容綱要	上課週數
Introduction	Some models, solutions, classification	1 week
First Order Differential Equations	Linear equations, Method of integrating factors, separable equations, Uniqueness and existence theorems for linear abd nonlinear equations, Autonomous equations and population dynamics, exact equations, Euler's method	3 weeks
Second order linear equations	Homogeneous equations with constant coefficients, fundamental solutions of linear homogeneous equations, linear independence, Wronskian, characteristic equations, reduction of order, nonhomogeneous equations, method of undetermined coefficients, variation of parameters, vibrations, forced vibrations	3 weeks
Higher order linear equations	General theory of nth order linear equations, homogeneous equations with constant coefficients, method of undetermined coefficients, variation of parameters	1 week
Series solutions of second order linear equations	power series, series solution near an ordinary point, regular singular points, Euler equations, series solution near a regular singular point, Bessel's equation	4 weeks
Laplace transform	Definition of the Laplace transform, initial value problems, step functions,impulse functions, convolution integrals	2 weeks
Systems of first order linear equations	matrices, eigenvalues, eigenvectors, basic theory, homogeneous equations with constant coefficients, fundamental matrices, nonhomogeneous linear systems.	2 weeks