

南臺科技大學 104 學年度第 1 學期課程資訊

課程名稱	工程數學(一)
課程編碼	30D08204
系所代碼	03
開課班級	四技系統二甲
開課教師	楊汎緯
學分	3.0
時數	3
上課節次地點	五 2 3 4 教室 J006
必選修	必修
課程概述	We begin our program of studying ordinary differential equations by deriving them from physical or other problems (modeling), solving them by standard methods, and interpreting solutions and their graphs in terms of a given problem. The simplest ordinary
課程目標	It is expected that the students be acquainted with solid knowledge of basic principles, methods, and results, and a clear view what engineering mathematics is all about, and that it requires proficiency in all three phases of problem solving: <ul style="list-style-type: none"> • Modeling, that is, translating a physical or other problem into a mathematical forms, into a mathematical model; this can be an algebraic equation, a differential equation, a graph, or some other mathematical expression. • Solving the model by selecting and applying a suitable mathematical method, often requiring numeric work on a computer. • Interpreting the mathematical result in physical or other terms to see what it practically means and implies.
課程大綱	第 1 章 一階常微分方程式 1.1 基本觀念・模擬 1.3 可分離微分方程式・模擬 1.4 正合常微分方程式・積分因子 1.5 線性常微分方程式・柏努利方程式・人口動態學 第 2 章 二階線性微分方程式 2.1 二階齊性線性常微分方程式 2.2 齊性線性常係數常微分方程式 2.5 尤拉—歌西方程式 2.6 解的存在與唯一性・榮斯基恩 2.7 非齊性常微分方程式

	<p>2.9 模擬：電路</p> <p>2.10 參數變換法解方程式</p> <p>第 3 章 高階線性微分方程式</p> <p>3.1 齊性線性常微分方程式</p> <p>3.2 齊性常係數常微分方程式</p> <p>3.3 非齊性線性常微分方程式</p> <p>第 6 章 拉普拉斯轉換</p> <p>6.1 拉普拉斯轉換・反轉換・線性・s 軸位移</p> <p>6.2 導函數與積分式之轉換</p> <p>6.3 單位階梯函數・t 軸位移</p> <p>6.4 短脈衝・狄拉克突波函數・部份函數</p> <p>6.5 連結・積分方程式</p> <p>6.6 轉換式之微分與積分</p>
英文大綱	<p>Chapter 1 First-Order Ordinary Differential Equations.</p> <p>1.1 Basic concepts. Modeling</p> <p>1.3 Separable ODEs. Modeling</p> <p>1.4 Exact ODEs. Integrating factors</p> <p>1.5 Linear ODEs. Bernoulli Equations. Population dynamics</p> <p>Chapter 2 Second-Order Linear Differential Equations.</p> <p>2.1 Homogeneous linear ODEs of second order</p> <p>2.2 Homogeneous linear ODEs with constant coefficients</p> <p>2.5 Euler-Cauchy equations</p> <p>2.6 Existence and uniqueness of solutions. Wronskian</p> <p>2.7 Nonhomogeneous ODEs</p> <p>2.9 Modeling: electric circuits</p> <p>2.10 Solution by variation of parameters</p> <p>Chapter 3 Higher Order Linear Differential Equations.</p> <p>3.1 Homogeneous linear ODEs</p> <p>3.2 Homogeneous linear ODEs with constant coefficients</p> <p>3.3 Nonhomogeneous linear ODEs</p> <p>Chapter 6 Laplace Transforms.</p> <p>6.1 Laplace transform. Inverse transform. Linearity. s-shifting</p> <p>6.2 Transforms of derivatives and integrals</p> <p>6.3 Unit step function. t-shifting</p> <p>6.4 Short impulse. Dirac's delta function. Partial functions</p> <p>6.5 Convolution. Integral equations</p> <p>6.6 Differentiation and integration of transforms</p>

教學方式	
評量方法	
指定用書	Advanced Engineering Mathematics
參考書籍	*高等工程數學(上)第 10 版：江大成、陳常侃著，全華書局，2012 年出版，ISBN:978-957-21-8510-0 *高等工程數學精華版：黃世杰譯，歐亞書局，2012 年出版，ISBN:978-986-86132-5-6
先修科目	
教學資源	
注意事項	
全程外語授課	0
授課語言 1	華語
授課語言 2	
輔導考照 1	
輔導考照 2	