

## 南臺科技大學 104 學年度第 2 學期課程資訊

課程名稱	工程數學(二)
課程編碼	30D08301
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	四 7 8 9 教室 J206
必選修	必修
課程概述	<p>We begin studying ordinary differential equations by deriving them from physical or other problems (modeling), solving them by standard methods, and interpreting solutions and graphs in terms of a given problem.</p> <p>The simplest ordinary differential equations, called ODEs of the first order are to be initiated. In the second chapter we discuss linear ODEs of the second order. This chapter includes the derivation of general and particular solutions. Then we extend the concepts and methods for linear ODEs to orders more than 3.</p> <p>In chapter 6 we consider the Laplace transform and its application to engineering problems involving ODEs. The Laplace transform is a powerful method for solving linear ODEs and corresponding initial value problems without first determining a general a general solution.</p>
課程目標	<p>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:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Solving the model by selecting and applying a suitable mathematical method, often requiring numeric work on a computer.</li> <li>• Interpreting the mathematical result in physical or other terms to see what it practically means and implies.</li> </ul>
課程大綱	<p>第 9 章 向量微分、梯度、散度、旋度</p> <p>9.1 二度及三度空間向量</p> <p>9.2 內積</p> <p>9.3 向量積</p> <p>9.4 向量場與純量場・導函數</p> <p>9.5 曲線・弧長・曲率・轉距</p>

	<p>9.6 多變數函數  9.7 純量場梯度・方向導函數  9.8 向量場散度  9.9 向量場旋度  第 10 章 向量積分・積分定理  10.1 線積分  10.2 與路徑無關之線積分  10.3 雙重積分  10.4 平面之葛林定理  10.6 面積分  10.7 三重積分・高斯發散定理  10.9 史托克思定理</p> <p>第 11 章 傅立葉級數、積分及轉換  11.1 傅立葉級數  11.2 週期為 <math>2L</math> 之函數  11.3. 偶函數與奇函數・半程展開式  11.6 三角多項式之近似  11.7 傅立葉積分</p>
英文大綱	<p>Chapter 9 Vector Differential Calculus, Gradient, Div, Curl  9.1 Vectors in 2-space and 3-space  9.2 Inner Product (Dot Product)  9.3 Vector Product (Cross Product)  9.4 Vector and Scalar Functions and Fields. Derivatives  9.5 Curves. Arc Length. Curvature. Torsion  9.6 Calculus Review: Functions of Several Variables  9.7 Gradient of a Scalar Field. Directional Derivative  9.8 Divergence of a Vector Field  9.9 Curl of a Vector Field  Chapter 10 Vector Integral Calculus. Integral Theorem  10.1 Line Integrals  10.2 Path Independence of Line Integrals  10.3 Calculus Review: Double Integrals  10.4 Green's Theorem in the Plane  10.5 Surface for Surface Integrals  10.6 Surface Integrals  10.7 Triple Integrals. Divergence Theorem of Gauss  10.8 Stokes's Theorem  Chapter 11 Fourier Series, Integral, and Transform</p>

	11.1 Fourier Series 11.2 Function of Any Period $p = 2L$ 11.3 Even and Odd Functions. Half-Range Expansions 11.6 Approximation by Trigonometric Polynomials 11.7 Fourier Integral
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 江大成、陳常侃編譯 江昭暘、黃柏文審閱 全華書局 工程數學 黃世杰編譯 歐亞書局
先修科目	微積分、普通物理
教學資源	
注意事項	平時分數參考上課出席率及上課態度等
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	