

工程數學下

114-2 開課

收藏

加入預選

流水號
47355

課號
ME2002

課程識別碼
502 20002

班次 04

3 學分

必帶 / 必修

國際半導體學士學位學程 / 機械工程學系 / 工學院院學士學位 / 智慧工程科技全英語學士學位學程

林以凡

一 3, 4 / 三 2

綜401

2 類

修課總人數 42 人
本校 42 人

無領域專長

英文授課

[NTU COOL](#)

[核心能力與課程規劃關聯圖](#)

目 備註

機械系、國際半導體、全英工學士 本課程以英語授課。

工學院院學士 本課程以英語授課。院學士核心必修-甲、乙組

↗ 本校選課狀況

已選上	剩餘名額	已登記
49 / 42	0	0

目 課程概述

In this course, we will review vector calculus and introduce the elementary theory of the functions of a complex variable covering operations with complex numbers, analytic functions, complex integration, Cauchy's theorem and its applications, poles and residues, and power series. In the second half of this semester, we will discuss Fourier series and Fourier transforms. Then we will study different types of partial differential equation problems.

🕒 課程目標

The objective of this course is that by the end of the semester, you will learn

- gradient, divergence and curl of a vector point function and related identities;
- evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification;
- analytic functions and complex integration;
- Fourier series, integral, and transform;
- PDE in heat, wave, and Laplace equations.

You will also

- compute vector differential calculus (knowing the physical meaning of gradient, divergence, and curl operators);
- compute vector integral calculus (knowing divergence theorem and Stoke's theorem);
- represent complex numbers algebraically and geometrically;
- apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra;
- evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula;

- represent functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem;
- understand how partial differential equations arise in the mathematical description of heat flow and vibration;
- demonstrate the ability to solve initial boundary value problems;
- express and explain the physical interpretations of common forms of PDEs;
- be acquainted with applications of partial differential equations in various disciplines of study.

☰ 課程要求

🕒 預期每週課前或/與課後學習時數

5

🕒 Office Hour

📖 指定閱讀

P. V. O'Neil, Advanced Engineering Mathematics, CENGAGE Learning, 8th Ed, 2018.

📖 參考書目

Dennis G. Zill, Advanced Engineering Mathematics, Jones & Bartlett Learning, 7th Ed, 2017.

🕒 評量方式

10%	Quiz
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5%	Team Collaboration
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12%	Relay Quiz Preparation
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3%	Other Team's Evaluation
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15%	Relay Quiz
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3%	Peer Evaluation
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39%	Midterms
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13%	Final Exam
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0% Class Attendance and Attentiveness

1. 本校尚無訂定 A+ 比例上限。
 2. 本校採用等第制評定成績，學生成績評量辦法中的百分制分數區間與單科成績對照表僅供參考，授課教師可依等第定義調整分數區間。詳見 [學習評量專區](#)。
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 針對學生困難提供學生調整方式

 補課資訊

課程進度

02/23, 02/25 Vector Differential Calculus
第 1 週

03/02, 03/04 The Gradient Field, Divergence, and Curl
第 2 週

03/09, 03/11 Vector Integral Calculus
第 3 週

03/16, 03/18 Divergence Theorem and Stokes' Theorem
第 4 週

03/23, 03/25 Midterm I, Functions of a Complex Variable
第 5 週

03/30, 04/01 Integration in the Complex Plane
第 6 週

04/06, 04/08 Relay Quiz I
第 7 週

04/13, 04/15 Series and Residues
第 8 週

04/20, 04/22 Series and Residues, Fourier Series
第 9 週

04/27, 04/29 Midterm II, Fourier Series
第 10 週

05/04, 05/06 Fourier Series, Fourier Integral
第 11 週

05/11, 05/13 Fourier Transform
第 12 週

05/18, 05/20 Midterm III, Partial Differential Equation
第 13 週

05/25, 05/27 PDE - Heat and Laplace Equations
第 14 週

06/01, 06/03 PDE - Laplace and Wave Equations
第 15 週

06/08, 06/10 Final Exam, Relay Quiz III
第 16 週

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