淡江大學１０９學年度第１學期課程教學計畫表

課程名稱	微積分	授課教師	林尚文 SHANG-WEN LIN
	CALCULUS		
開課系級	電機系電通一Ｒ	開課資料	實體課程 必修 單學期 3學分
	TETEB1R		

系（所）教育目標

一、教育學生具備數學、科學及工程知識以解決電機之相關問題。

二、教育學生能具備獨立完成所指定任務及團隊精神之電機工程師。

三、教育學生具備洞悉電機產業趨勢變化，以因應現今多元化職場生涯之挑戰。

本課程對應院、系(所)核心能力之項目與比重

A. 具有運用數學工具配合科學方法以解決電機工程問題之能力。（比重：75.00）

B. 具有設計與執行電機實驗及分析與解釋數據之能力。（比重：15.00）

F. 具有發掘、分析、應用研究成果及因應電機工程複雜且整合性問題之能力。（比重：10.00）

本課程對應校級基本素養之項目與比重

2. 資訊運用。（比重：20.00）

5. 獨立思考。（比重：80.00）

課程簡介	本課程主要介紹微積分的理論、計算方法及應用。上學期內容包括(1)函數、圖形及極限, (2)微分概念及其應用, (3)三角函數、指數、對數函數之微分等等。在提昇學生學習興趣的同時, 也培養學生推理思考及數理運算能力。
	This course introduces the theory of the Calculus, the calculation approaches and its applications. The contents include the (1) functions, graph of function, and limit, (2) differentiation and its applications, (3) trigonometric function, exponential and logarithmic functions and their derivatives and so on. We aim to improve students' interests in learning and to develop their thinking and computing abilities.

本課程教學目標與認知、情意、技能目標之對應

將課程教學目標分別對應「認知（Cognitive）」、「情意（Affective）」與「技能（Psychomotor）」的各目標類型。

一、認知(Cognitive)：著重在該科目的事實、概念、程序、後設認知等各類知識之學習。
二、情意(Affective)：著重在該科目的興趣、倫理、態度、信念、價值觀等之學習。
三、技能(Psychomotor)：著重在該科目的肢體動作或技術操作之學習。

序號	教學目標(中文)	教學目標(英文)
1	學生將能夠理解課程中所介紹到的函數之極限與連續的概念。	Students will be able to understand the concepts of the limits and the continuity of a function.
2	學生將能夠理解微分與積分理論的運算與應用的概念，並實際動手運算及繪製曲線圖。	Students will be able to understand the the theory and applications of the derivatives, as well as integral, and be able to do the calculation and curves graphing in practice.
3	學生將能夠理解三角函數與指數、對數函數之微分、積分與應用。	Students will be able to understand the differentiation and integration of trigonometric, exponential and logarithmic functions and their applications.

教學目標之目標類型、核心能力、基本素養教學方法與評量方式

序號	目標類型	院、系(所)核心能力	校級基本素養	教學方法	評量方式
1	認知	A	2	講述、討論、實作	測驗、作業
2	認知	B	5	講述、實作	測驗、作業、討論(含課堂、線上)
3	認知	F	5	講述	測驗

授課進度表

週次	日期起訖	內容 (Subject/Topics)	備註
1	109/09/14~109/09/20	1.5 Finding Limits Graphically and Numerically 1.6 Evaluating Limits Analytically 1.7 Continuity and One-Sided Limits 1.8 Infinite Limits	
2	109/09/21~109/09/27	2.1 The Derivative and The tangent Problem 2.2 Basic Differentiation Rules and Rates of Change 2.3 Product and Quotient Rules and Higher-Order Derivatives 2.4 The Chain Rule	
3	109/09/28~109/10/04	2.5 Implicit Differentiation 2.6 Derivatives of Inverse Functions 2.7 Related Rates 2.8 Newton's Method	
4	109/10/05~109/10/11	3.1 Extrema on an Interval 3.2 Rolle's Theorem and the Mean Value Theorem 3.3 Increasing and Decreasing Functions and First Derivative Test 3.4 Concavity and the Second Derivative Test	
5	109/10/12~109/10/18	3.5 Limits at Infinity 3.6 Optimation Problems 3.7 Differentials	
6	109/10/19~109/10/25	4.1 Antiderivatives and Indefinite 4.2 Area 4.3 Riemann Sums and Definite Integrals 4.4 The Fundamental Theorem of Calculus	

7	109/10/26~ 109/11/01	4.5 Integration by Subsititution 4.6 Indeterminate Forms and L'Hospital's Rule 4.7 The Natural Logarithmic Function：Integration 4.8 Inverse Trigonometric Functions：Integration	
8	109/11/02~ 109/11/08	5.1 Area of a Region Between Two Curves 5.2 Volume：The Disk Method 5.3 Volume：The Shell Method 5.4 Arc Length and Surfaces of Revolution	
9	109/11/09~ 109/11/15	6.1 Integration by Parts 6.2 Trigonometric Integrals 6.3 Trigonometric Substitution	
10	109/11/16~ 109/11/22	期中考試週	
11	109/11/23~ 109/11/29	6.4 Partial Fractions 6.5 Numerical Integration 6.6 Integration by Tables and Other Integration Techniques 6.7 Improper Integrals	
12	109/11/30~ 109/12/06	7.1 Sequence 7.2 Series and Convergence 7.3 The Integral and Comparisons Test 7.4 Other convergence Tests	
13	109/12/07~ 109/12/13	7.5 Taylor Polynomials and Approximations 7.6 Power Series 7.7 Representation of Functions by Power Series 7.8 Taylor and Maclaurin Series	
14	109/12/14~ 109/12/20	8.1 Plane Curves and Parametric Equations 8.2 Parametric Equations and Calculus 8.3 Polar Coordinates and Polar Graphs 8.4 Area and Arc Length in Polar Coordinates 8.5 Polar Equations of Conics and Kepler's Laws	
15	109/12/21~ 109/12/27	11.1 Introduction to Functions of Several Variables 11.2 Limits and Continuity 11.3 Partial Derivatives 11.4 Differenetials and the Chain Rules	
16	109/12/28~ 110/01/03	11.5 Directional Derivatives and Gradients 11.6 Tangent Planes and Normal Lines 11.7 Extrema of Functions of Two Variables 11.8 Lagrange Multipliers	
17	110/01/04~ 110/01/10	12.1 Iterated Integrals and Area in a Plane 12.2 Double Integral and Volume 12.3 Change of Variables：Polar Coordinates 12.6 Triple Integrals and Application 12.7 Triple Integrals in Other Coordinates	
18	110/01/11~ 110/01/17	期末考試週	

修課應注意事項	每節課點名(出缺席從第一週開始計算) 須登入Moodle做線上測驗 須加入FB社團並關助社團動態(與課程相關注意事項)
教學設備	電腦、投影機
教科書與教材	Larson and Edwards (2019). Essential Calculus：Metric Version. 4th Edition.
參考文獻	

批改作業 篇數	篇（本欄位僅適用於所授課程需批改作業之課程教師填寫）
學期成績 計算方式	◆出席率：　　　　　％　　◆平時評量：20.0　％　　◆期中評量：30.0　％ ◆期末評量：30.0　％ ◆其他〈實習〉：20.0　％
備　　考	「教學計畫表管理系統」網址：https://info.ais.tku.edu.tw/csp 或由教務處首頁→教務資訊「教學計畫表管理系統」進入。 ※不法影印是違法的行為。請使用正版教科書，勿不法影印他人著作，以免觸法。