國立台灣科技大學 114學年 第2學期　課程大綱

Spring 2026 NTUST Course Outline

授課教師：沈哲州

Instructor:Che-Chou shen

課程名稱：微積分(下)

Course Title：Calculus (II)

2026/11/4

課程代號： EE161B001 Course Code 學分數： 4 Credits	必選修：必修/全學年 Required/Electve:Required/Full Yr. 先修課程： Prerequisites
節次教室： Time/Location	R6(EE-406) R7(EE-406) T3(EE-406) T4(EE-406) WA(EE-406)
專業核心能力： Core Professional Competencies	
課程網址： Course Website	
課程宗旨： Course Objectives	Calculus is a fundamental course for engineering students. It plays an important role in the understanding of science, engineering, economics, and computer science. Calculus (II) will cover the following topics. The first topic is about how to model the motion of an object by the parametric equations of its position together with how to calculate the derivative and arc length of the corresponding plane curve. Subsequently, the parametric equations of position are transformed into the form of vector-valued function of position such that the velocity and the acceleration can be easily represented by the first and the second derivative in vector form. Second, we will extend the concept of differentiation (i.e., slope) to multi-variable function with respect to each independent variable. This is referred to as the partial derivative, which corresponds to the gradient vector. Gradient vector can be further applied to iteratively optimize the function and has been extensively used for model training in deep-learning applications. The integration of multi-variable function can also be used to estimate the volume under a 2D surface and the moment of mass for a 3D object. Third, the concept of vector field will be introduced. Then, the work done by the vector field on a moving object can be estimated using line integral. Similarly, it is also possible to calculate the flux through a surface or a contour by flux integral in the vector field.
課程大綱： Outline of Lectures	CH 8　Parametric equations and Polar coordinate (參數方程式與極座標) CH 9　Vectors and Geometry of space (空間向量與空間座標) CH 10　Vector-valued functions (空間向量函數) CH 11　Functions of several variables (多變數函數與其導數) CH 12　Multiple integral (多重積分) CH 13　Vector analysis (向量分析: 線積分與面積分)
授課方式： Method of Instruction	講授 Lecture：90% 分組討論 Group discussion：0% 案例研討 Case study：0% 操做練習 Practical exercises：10% 講授 Lecture：%
教科書： Textbooks	ESSENTIAL CALCULUS by Larson and Edwards

參考書目： References	Lecture notes will be published on Moodle2 platform
修課須知： Notice	1. Weekly exam will be hold from PM 06:25 to PM 07:15 on every Wednesday. 2. Within 48 hours of each lecture, students must finish the on-line practice on Moodle system.
評量方式： Grading	Midterm 30% + Final 30% + Quiz 30% + On-line Practice 10%
備註說明： Notes	Prerequisites: CALCULUS (I)