

106 年準大學生先修課程聯合認證平台計畫

課程內容

課程設定	
開課學校	國立中央大學
開課系所	數學系
課程名程	微積分
授課教師	饒維明
學分數	4
修課學生人數上限	本校學生：___130___ 外校學生：___70___
授課形式	<input checked="" type="checkbox"/> 實體授課 <input type="checkbox"/> 線上課程 <input type="checkbox"/> 其他 _____
上課地點	待定
上課時間	_7_ 月 _3_ 日 ~ _8_ 月 _18_ 日 星期 _一到五_：_9_:00_ ~ _12_:00_
課程相關事務聯絡窗口	
姓名、職稱	吳昭穎專任助理
電話	(03)4227151#65100
電子信箱	wucy@math.ncu.edu.tw
課程資訊	
課程概述	從“極限”微積分的基本觀念開始，漸漸發展微分和積分的技巧，它們定理的證明思維。課程也會提及微積分的一些應用。 Starting with the concept of limit on which calculus is based upon and gradually develop relevant techniques for differentiations and integrations. Some applications will also be introduced.
課程目標	學習微分與積分的基本知識和見識微積分的一些應用，透過本學科的技巧來培養學生的思考和解決問題的能力。 The objective of the course is to learn the basic techniques and ideas in calculus such as limits, differentiation and integration and apply these techniques in formulating and solving problems. The theoretical aspect of calculus is also emphasized.

<p>課程要求</p>	<p>課程時間緊密，數學學習也需要多時間去吸收，強烈建議本課學生勿在這期間修其它課程。因（採取國際標準）教課書，筆記，考試等文件都是用英文，學生若擁有基本英文閱讀能力會有很大幫助。</p> <p>Since the course is held on a tight schedule, and the learning of mathematics requires time to digest, students taking this class are strongly recommended not to take any other courses during this period. Course materials (text book, lecture notes) are in English (though lecture will be given in Chinese), adequate English reading is certainly a good thing to have.</p>
<p>指定閱讀</p>	<p>Textbook 教課書: Larson-Edwards-Shann Calculus ISBN-13:978-1-305-01307-0</p> <p>書本提早購買請聯絡歐亞書局—楊自華小姐:0939-660513, 02-77053367 Textbook website 書本網頁:Larsoncalculus.com</p>
<p>評量方式</p>	<p>Quizzes 小考: 25% Tests 期中考: 3 x25%</p>

課程大綱

週次	日期	單元主題	備註欄
彈性 Flexible		Sections (章節) p. 3, 1.2, 1.3, 1.4, 1.5, 2.1,	內容看教課書 See text for details
		Sections (章節) 2.2, 2.3, 2.4, 2.5, 2.6, 3.1,	進度看學生程度而定 Course progress depends on students' level
		Sections (章節) 3.2, 3.3, 3.5, 3.6, 3.7, 3.9,	
		Sections (章節) 4.1, 4.2, 4.3, 4.4, 4.5, 5.1,	
		Sections (章節) 5.2, 5.3, 5.4, 5.5, 5.6, 5.7,	
		Sections (章節) 5.8, 7.1, 7.2, 7.3, 7.4, 8.1	
		Sections (章節) 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8	

● 若為合授課程，可於備註欄填寫該週授課教師姓名

Contents of Textbook

- P Preparation for Calculus
 - P.1 Graphs and Models
 - P.2 Linear Models and Rates of Change
 - P.3 Functions and Their Graphs
 - P.4 Fitting Models to Data
- 1 Limits and Their Properties
 - 1.1 A Preview of Calculus
 - 1.2 Finding Limits Graphically and Numerically
 - 1.3 Evaluating Limits Analytically
 - 1.4 Continuity and One-Sided Limits
 - 1.5 Infinite Limits
- 2 Differentiation
 - 2.1 The Derivative and the Tangent Line 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
 - 2.5 Implicit Differentiation
 - 2.6 Related Rates
- 3 Applications of Differentiation
 - 3.1 Extrema on an Interval
 - 3.2 Rolle's Theorem and the Mean Value Theorem
 - 3.3 Increasing and Decreasing Functions and the First Derivative Test
 - 3.4 Concavity and the Second Derivative Test
 - 3.5 Limits at Infinity
 - 3.6 A Summary of Curve Sketching
 - 3.7 Optimization Problems
 - 3.8 Newton's Method
 - 3.9 Differentials
- 4 Integration
 - 4.1 Antiderivatives and Indefinite Integration
 - 4.2 Area
 - 4.3 Riemann Sums and Definite Integrals
 - 4.4 The Fundamental Theorem of Calculus
 - 4.5 Integration by Substitution
 - 4.6 Numerical Integration
- 5 Logarithmic, Exponential, and Other Transcendental Functions
 - 5.1 The Natural Logarithmic Function: Differentiation
 - 5.2 The Natural Logarithmic Function: Integration
 - 5.3 Inverse Functions

- 5.4 Exponential Functions: Differentiation and Integration
- 5.5 Bases Other than e and Applications
- 5.6 Inverse Trigonometric Functions: Differentiation
- 5.7 Inverse Trigonometric Functions: Integration
- 5.8 Hyperbolic Functions
- 6 Differential Equations
 - 6.1 Slope Fields and Euler's Method
 - 6.2 Differential Equations: Growth and Decay
 - 6.3 Separation of Variables and the Logistic Equation
 - 6.4 First-Order Linear Differential Equations
- 7 Applications of Integration
 - 7.1 Area of a Region Between Two Curves
 - 7.2 Volume: The Disk Method
 - 7.3 Volume: The Shell Method
 - 7.4 Arc Length and Surfaces of Revolution
 - 7.5 Work
 - 7.6 Moments, Centers of Mass, and Centroids
 - 7.7 Fluid Pressure and Fluid Force
- 8 Integration Techniques, L'Hopital's Rule, and Improper Integrals
 - 8.1 Basic Integration Rules
 - 8.2 Integration by Parts
 - 8.3 Trigonometric Integrals
 - 8.4 Trigonometric Substitution
 - 8.5 Partial Fractions
 - 8.6 Integration by Tables and Other Integration Techniques
 - 8.7 Indeterminate Forms and L'Hopital's Rule
 - 8.8 Improper Integrals