

Course Description(暫定)

Department of Mathematics

Nature of the course <input checked="" type="checkbox"/> required <input type="checkbox"/> elective		Area 麻煩老師勾選類別，或直接填寫_____。 <input type="checkbox"/> Algebra <input type="checkbox"/> Analysis <input type="checkbox"/> Geometry <input type="checkbox"/> Statistics <input type="checkbox"/> Applied Mathematics <input type="checkbox"/> Discrete Mathematics <input type="checkbox"/> Others			
Calculus <input checked="" type="checkbox"/> Calculus A <input type="checkbox"/> Calculus B					
Course number	201 101A1	Section number	08-12	Number of credits	4
Course title	Calculus				
Instructor	陳鵬文(08)、周謀鴻(09)、劉瓊如(10)、容志輝(11)、朱 樺(12)				
I. Contents :					
II.					
章節	週次	課程進度			
1. Limits and Continuity	第 1 週 09/13-09/16	1.1 Examples of Velocity, Growth Rate, and Area			
		1.2 Limit of Functions			
		1.3 Limits at Infinity and Infinite Limits			
		1.4 Continuity			
2. Differentiation	第 2 週 09/19-09/23	1.5 The Formal Definition of Limit			
		2.1 Tangent Lines and Their Slopes			
		2.2 The Derivative			
		2.3 Differentiation Rules			
	第 3 週 09/26-09/30	2.4 The Chain Rule			
		2.5 Derivatives of Trigonometric Functions			
		2.6 Higher-Order Derivatives			
		2.7 Using Differentials and Derivatives			
第 4 週 10/03-10/07	2.8 The Mean-Value Theorem				
	2.9 Implicit Differentiation				
	2.10 Antiderivatives and Initial-Value Problems				
	2.11 Velocity and Acceleration 緩衝時間				
3. Transcendental Function	第 5 週 10/10-10/14	3.1 Inverse Functions			
		3.2 Exponential and Logarithmic Functions			
		3.3 The Natural Logarithm and Exponential			
		3.4 Growth and Decay			
第 6 週 10/17-10/21	3.5 The Inverse Trigonometric Functions				
	3.6 Hyperbolic Functions				
	3.7 Second-Order Linear Des with Constant Coefficients				
4. More Applications of Differentiation	第 7 週 10/24-10/28	4.1 Related Rates			
		4.2 Finding Root of Equations			
		4.3 Indeterminate Forms			
		4.4 Extreme Values			
		4.5 Concavity and Inflections			

	第 8 週 10/31-11/04	4.6 Sketching the Graph of a Function	
		4.7 Graphing with Computers (※)	
		4.8 Extreme-Value Problems	
		4.9 Linear Approximations	
	第 9 週 11/0 -11/11	4.10 Taylor Polynomials	
		4.11 Roundoff Error, Truncation Error, and Computers (※)	
		緩衝時間	
11/12(六) 09:00~11:30 期中考 考試範圍 1.1~4.10 (英文命題)			
5. Integration	第 10 週 11/14-11/18	5.1 Sums and Sigma Notation	
		5.2 Areas as Limits of Sums	
		5.3 Definite Integral	
		5.4 Properties of the Definite Integral	
	第 11 週 11/21-11/25	5.5 The Fundamental Theorem of Calculus	
		5.6 The Method of Substitution	
		5.7 Areas of Plane Regions	
6. Techniques of Integration	第 12 週 11/28-12/02	6.1 Integration by Parts	
		6.2 Integrals of Rational Functions	
		6.3 Inverse Substitutions	
		6.4 Other Methods for Evaluating Integrals	
		第 13 週 12/05-12/09	6.5 Improper Integrals
			6.6 The Trapezoid and Midpoint Rules
			6.7 Simpson's Rule
		6.8 Other Aspects of Approximate Integration	
		緩衝時間	
7. Applications of Integration	第 14 週 12/12-12/16	7.1 Volumes by Slicing – Solids of Revolution	
		7.2 More Volumes by Slicing	
		7.3 Arc Length and Surface Area	
		7.4 Mass, Moments, and Centre of Mass	
		第 15 週 12/19-12/23	7.5 Centroids
			7.6 Other Physical Applications
			7.7 Applications in Business, Finance, and Ecology
			7.8 Probability
			7.9 First-Order Differential Equations
8. Conics, Parametric Curves, and Polar Curves	第 16 週 12/26-12/30	8.1 Conics (※)	
		8.2 Parametric Curves	
		8.3 Smooth Parametric Curves and Their Slopes	
		8.4 Arc Lengths and Areas for Parametric Curves	
		第 17 週 01/02-01/06	8.5 Polar Coordinates and Polar Curves
			8.6 Slopes, Areas, and Arc Lengths for Polar Curves
			緩衝時間
1/7(六) 09:00~11:30 期末考 考試範圍 5.1~8.6 (英文命題)			

(※) 此符號標示之課程，可由任課教師自行決定是否為教學內容，不列入考試範圍中。

III. Course prerequisite :

High School Mathematics

IV. Reference material (textbook(s)) :

Calculus: A Complete Course seventh edition.

V. Grading scheme :

Midterm exam: 40%, Final exam: 40%, Quizzes and/or homework: 20%

VI. Others :

☆08-11 班：上課時間：三 78 五 12 、 實習課時間：三 9

12 班：上課時間：二 78 四 56 、 實習課時間：二 9

☆各班實習課分組教室：將公告於微積分甲統一教學網站公佈。

☆微積分甲統一教學網站：<http://www.math.ntu.edu.tw/~mathcal/a/> 。

☆各班助教 Office Hour 時間：將公告於微積分甲統一教學網站公佈。

☆習題：習題繳交與否依各授課教師規定；習題解答將於公佈於微積分甲統一教學網站。

☆期中、期末考題目以英文命題。

VII. Course Goal :

Study the process of approximation and its limitation (errors), learn the tools and techniques for analyzing regular mappings with applications, and deepen the understanding of elementary functions.