

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 101A2	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 :

章節	週次	課程進度
9. Sequences, Series, and Power Series	第一週 (2/20~2/24)	9.1 Sequences and Convergence
		9.2 Infinite Series
		9.3 Convergence Tests for Positive Series
		9.4 Absolute and Conditional Convergence
	第二週 (2/27~3/2)	9.5 Power Series
		9.6 Taylor and Maclaurin Series
		9.7 Applications of Taylor and Maclaurin Series
		9.8 The Binomial Theorem and Binomial Series
10. Vectors and Coordinate Geometry in 3-Space	第三週 (3/5~3/9)	9.9 Fourier Series
		10.1 Analytic Geometry in Three Dimensions
		10.2 Vectors
	第四週 (3/12~3/16)	10.3 The Cross Product in 3-Space
		10.4 Planes and Lines
		10.5 Quadric Surfaces
		10.6 Cylindrical and Spherical Coordinates
11. Vector Functions and Curves	第五週 (3/19~3/23)	10.7 A Little Linear Algebra
		10.8 Using Maple For Vector and Matrix Calculations
		11.1 Vector Functions of One Variable
	第六週 (3/26~3/30)	11.2 Some Applications of Vector Differentiation
		11.3 Curves and Parametrizations
		11.4 Curvature, Torsion, and the Frenet Frame
12. Partial Differentiation	第七週 (4/2~4/6)	11.5 Curvature and Torsion for General Parametrizations
		11.6 Kepler's Laws of Planetary Motion
	12.1 Functions of Several Variables	
	第八週 (4/9~4/13)	4/3(二)~4/6(五)放假
		12.2 Limits and Continuity
12.3 Partial Derivatives		
		12.4 Higher-Order Derivatives
		12.5 The Chain Rule

	第九週 (4/16~4/20)	12.6 Linear Approximations, Differentiability, and Differentials
		12.7 Fradients and Directional Derivatives
		12.8 Implicit Functions
		12.9 Taylor Series and Approximations
期中考 4/22 (日) 09:00~11:30 考試範圍: 9.1~12.9 (英文命題)		
13. Applications of Partial Derivatives	第十週 (4/23~4/27)	13.1 Extreme Values
		13.2 Extreme Values of Functions Defined on Restricted Domains
		13.3 Lagrange Multipliers
		13.4 The Method of Least Squares
		13.5 Parametric Problems
14. Multiple Integration	第十一週 (4/30~5/4)	13.6 Newton's Method
		13.7 Calculations with Maple
		14.1 Double Integrals
		14.2 Iteration of Double Integrals in Cartesian Coordinates
14. Multiple Integration	第十二週 (5/7~5/11)	14.3 Improper Integrals and a Mean-Value Theorem
		14.4 Double Integrals in Polar Coordinates
		14.5 Triple Integrals
		14.6 Change of Variables in Triple Integrals
15. Vector Fields	第十三週 (5/14~5/18)	14.7 Applications of Multiple Integrals
		15.1 Vector and Scalar Fields
		15.2 Conservative Fields
		15.3 Line Integrals
16. Vector Calculus	第十四週 (5/21~5/25)	15.4 Line Integrals of Vector Fields
		15.5 Surfaces and Surface Integrals
		15.6 Oriented Surfaces and Flux Integrals
	第十五週 (5/28~6/1)	16.1 Gradient, Divergence, and Curl
		16.2 Some Identities Involving Grad, Div, and Curl
		16.3 Green's Theorem in the Plane
		16.4 The Divergence Theorem in 3-Space
17. Ordinary Differential Equations	第十六週 (6/4~6/8)	16.5 Stokes's Theorem
		16.6 Some Physical Applications of Vector Calculus
		16.7 Orthogonal Curvilinear Coordinates
		17.1 Classifying Differential Equations
	第十七週 (6/11~6/15)	17.2 Solving First-Order Equations
		17.3 Existence, Uniqueness, and Numerical Methods
		17.4 Differential Equations of Second Order
期末考 6/17 (日) 13:30~16:00 考試範圍: 13.1~17.7 (英文命題)		

說明: (※) 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。

II. Course prerequisite :

High School Mathematics

III. Reference material (textbook(s)) :

Calculus: A Complete Course seventh edition.

IV. Grading scheme :

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

V. 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。

VI. 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.