

課程名稱(中文)	微積分（一）
先修科目或先備能力	
課程概述	Functions, Limits and Continuity --brief review of functions, formal definition of limit, one-sided limit, limits involving infinity, continuity, horizontal and vertical asymptotes Derivatives and Applications of Derivatives --tangent lines, rate of changes, derivatives, basic differentiation rules, the chain rule, parametric equations, implicit differentiation, higher derivatives, linear approximations and differentials, the mean value theorem, extreme values of a function, curve sketching, optimization problems, indeterminate forms and the L'Hospital's rule Integration and Applications of Integrals --anti-derivatives, indefinite integrals, Riemann sums and definite integral, integral rules, integration by substitution, the mean value and fundamental theorems, areas between curves Integration Techniques and Improper Integrals --Basic integration formulas, integration by parts, trigonometric substitution, partial fractions, improper integrals Transcendental Functions --Logarithms, exponential functions, trigonometric functions, inverse trigonometric functions
學習目標	介紹單變數實數值函數之極限、連續、微分及積分，並介紹其微分及積分之方法與應用。
教科書	<i>University Calculus (early transcendentals)</i>, fourth edition in SI units (global edition), by J. Hass, C. Heil, P. Bogacki, M.D. Weir, and G.B. Thomas. Jr., Pearson Education, Inc., 2020. (請尊重智慧財產權，不得非法影印教師指定之教科書籍)

教學要點概述：

1. 教材編選：☐ 自編教材 ☒教科書作者提供

2. 教學方法：☐ 投影片講述 ☒板書講述

3. 評量方法：☐ 上課點名 0%, ☒小考 25%, ☐ 作業 0%, ☐ 程式實作 0%,
☐ 實習報告 0%, ☐ 專案 0%, ☒期中考 25%*2=50%, ☒期末考 25%,
☐ 期末報告 0%, ☐ 其它 0%

課程進度：

第一週：Functions

第二週：Limits and Continuity

第三週：Limits and Continuity

第四週：Derivatives and Applications of Derivatives

第五週：Derivatives and Applications of Derivatives

第六週：Derivatives and Applications of Derivatives

第七週：Derivatives and Applications of Derivatives

第八週：Derivatives and Applications of Derivatives

第九週：Derivatives and Applications of Derivatives

第十週：Integration and Applications of Integrals

第十一週：Integration and Applications of Integrals

第十二週：Integration and Applications of Integrals

第十三週：Integration and Applications of Integrals

第十四週：Integration and Applications of Integrals

第十五週：Integration and Applications of Integrals

第十六週：Integration Techniques and Improper Integrals

第十七週：Integration Techniques and Improper Integrals

第十八週：Integration Techniques and Improper Integrals

數學系學士班核心能力	本課程能培養學生此項核心能力者請打✓(請複選 3~5 項)
具備紮實的數學、應用數學及機率與統計等主題專業基礎知識	✓
具備自然科學、工程或社會科學跨領域之基本知識	✓
具備撰寫程式語言與電腦輔助計算能力	
具備能將數學或機率與統計知識應用於各領域之能力	✓
具備數理邏輯、獨立思考與分析之能力	✓
具備溝通能力及分工合作之能力	
具備終身自我學習成長之能力	✓