數學系課程核心教材內容

課程名稱：(中文）高等微積分(一) (英文）Advanced Calculus (I)				開課單位	學士班
				課程代碼	2102001
學分數	4	必/選修	必修	開課年級	二
教學目標：訓練學生之數學分析的能力 課程概述：討論函數的連續、可微及積分性質 先修科目或先備能力：微積分(一)(二)					
建議參考書目	Wade, *An Introduction to Analysis*. Kosmala, *A Friendly Introduction to Analysis*.				

課程大綱

單元主題	內容綱要	上課週數
Sequences in $\mathbb{R}$	(a) Completeness axiom. (b) Limits of sequences. (c) Limit theorems. (d) Bolzano-Weierstrass Theorem. (e) Cauchy sequences.	3
Continuity on $\mathbb{R}$	(a) Two-sided limits. (b) One-sided limits. (c) Continuity. (d) Uniform continuity	4
Differentiability on $\mathbb{R}$	(a) The derivative. (b) Differentiability theorems. (c) Mean-value theorem and Taylor's formula. (d) Local extrema and second derivative test.	3
Integrability on $\mathbb{R}$	(a) Riemann integrals. (b) Fundamental theorem of Calculus. (c) Improper integrals.	3
Infinite series of functions	(a) Uniform convergence of series. (b) Power series. (c) Analytic functions.	3

數學系課程核心教材內容

課程名稱：(中文）高等微積分(二) (英文）Advanced Calculus (II)				開課單位	學士班
				課程代碼	2102002
學分數	4	必/選修	必修	開課年級	二
教學目標：訓練學生之數學分析的能力 課程概述：討論函數的連續、可微及積分性質 先修科目或先備能力：高等微積分(一)					
建議參考書目	Wade, *An Introduction to Analysis*. Kosmala, *A Friendly Introduction to Analysis*.				

課程大綱

單元主題	內容綱要	上課週數
Euclidean spaces $\mathbb{R}^n$	(a) Open sets and closed sets in $\mathbb{R}^n$. (b) Interior, closure and boundary. (c) Connected and disconnected sets. (d) Compact sets.	3
Convergence in $\mathbb{R}^n$	(a) Limits of sequences. (b) Limits of functions. (c) Continuous functions.	3
Differentiability on $\mathbb{R}^n$	(a) Partial derivatives. (b) Definition of differentiability. (c) Local extrema and second derivative test. (d) Mean-value theorem and Taylor's formula. (e) Inverse and implicit function theorems.	4
Integration on $\mathbb{R}^n$	(a) Jordan regions. (b) Riemann integration on Jordan regions. (c) Iterated integrals. (d) Change of variables.	3
Vector calculus	(a) Curves and surfaces. (b) Green's theorem. (c) Divergence theorem. (d) Stoke's theorem.	3