

數學系課程核心教材內容

課程名稱：(中文) 數學導論 (英文) Introductory Mathematics				開課單位	學士班
				課程代碼	
學分數	3	必/選修	必修	開課年級	一
<p>教學目標：培養學生以數學方法思考，熟悉數學中的基本語言、敘述、證明技巧。幫助學生發展對嚴謹證明的分析及寫作能力。</p> <p>課程概述：</p> <p>先修科目或先備能力：</p>					
建議參考書目	William Barnier, Norman Feldman, <i>Introduction to Advanced Mathematics</i> Douglas D. Smith, Maurice Eggen, Richard St. Andre, <i>A Transition to Advanced Mathematics</i> C.C. Pinter, <i>Set Theory</i> T.M. Apostol, <i>Mathematical Analysis</i>				

課程大綱

單元主題	內容綱要	上課週數
Logic, Language of Proofs, and Sets	Negation, Truth tables, Quantifiers, Methods of proofs, Operations on sets, Indexed families	1-2
Integers and Mathematical Induction	Mathematical induction, Recursions, Division algorithm, Euclidean algorithm, Introduction to Integral Number Theory	3-4
Relations and Functions	Cartesian product, Equivalence relations and partitions, Quotient, Congruence, Composite and inverse functions, Permutations, Image and inverse image of sets	3-4
Combinatorial Methods	Pigeonhole principle, Principle of inclusion-exclusion, Binomial theory	1-2
Countable and Uncountable Sets	Schroeder-Bernstein theory, Countable and uncountable sets, Cardinal numbers and its arithmetic	1-2
Introduction to Groups (Option)	Operations, Groups, Homomorphisms and isomorphisms, Permutation groups, Cyclic groups	1-2
Foundations of Advances Calculus (Option)	Sequence, Convergence, Completeness of \mathbb{R} , Limits of functions, Continuity	1-2

參考用書 Peter Fletcher, C. Wayne Patty, *Foundations of Higher Mathematics*