

Undergraduate Courses of Department of Mathematics and Information Education

Curriculum Structure & Course Title

114 Academic Year

科目名稱	Course title	Required/ Elective	Credits	Grade	Remark
Specialization Courses in Mathematics Division (Required 46 credits, Elective 15 credits, Free Elective 9 credits, Total 70 credits)					
(一) Foundation Courses (46 credits are required)					
(1) Mathematics Courses					
線性代數(一)	Linear Algebra (I)	Required	3	1-1	Specialty Module for Mathematics and Teaching Enhancement
微積分(一)	Calculus (I)	Required	4	1-1	Specialty Module for Mathematics and Teaching Enhancement
線性代數(二)	Linear Algebra (II)	Required	3	1-2	Must complete “ <i>Linear Algebra (I)</i> ” first
微積分(二)	Calculus (II)	Required	4	1-2	Must complete “ <i>Calculus (I)</i> ” first ; Specialty Module for Mathematics and Teaching Enhancement
高等微積分(一)	Advanced Calculus (I)	Required	4	2-1	
高等微積分(二)	Advanced Calculus (II)	Required	4	2-2	Must complete “ <i>Advanced Calculus (I)</i> ” first
機率論	Probability Theory	Required	3	3-1	
統計學	Statistics	Required	3	3-2	
(2) Mathematics Education Courses					
數學教育概論	Introduction to Mathematics Education	Required	2	1-1	Specialty Module for Mathematics and Teaching Enhancement
數學概念發展	Conceptual Development in Mathematics	Required	3	2-1	Specialty Module for Mathematics and Teaching Enhancement
數學解題研究	Study of Problem Solving in Mathematics	Required	2	2-2	Specialty Module for Mathematics and Teaching Enhancement
數學教學與評量	Teaching and Assessment in Mathematics	Required	2	3-1	Specialty Module for Mathematics and Teaching Enhancement
數學課程研究	Studies on Mathematics Curriculum	Required	3	3-2	Specialty Module for Mathematics and Teaching Enhancement
(3) Information and Information Education Courses					
計算機概論	Introduction to Computer Science	Required	3	1-1	
程式設計	Computer Programming	Required	3	2-1	Specialty Module for Information and Education Innovation
(二) Core Courses (15 credits are required)					
(1) Mathematics Courses					
離散數學	Discrete Mathematics	Elective	3	2-1	

科目名稱	Course title	Required/ Elective	Credits	Grade	Remark
代數	Algebra	Elective	3	2-2	
高等線性代數	Advanced Linear Algebra	Elective	3	3-1	
微分方程	Differential Equations	Elective	3	3-1	
向量分析	Vector Analysis	Elective	3	3-2	
數據分析在財務上的應用	Data Analysis with Application to Finance	Elective	3	3 ~ 4	
(2) Mathematics Education Courses					
數學素養探索與教學	Exploration and Teaching of Mathematics Literacy	Elective	2	2-1	
幼兒之數學教育	Mathematics Education for Early Childhood	Elective	2	2-2	Specialty Module for Mathematics and Teaching Enhancement
小學數學科英語教學實務	Elementary Mathematics Teaching Practice in English	Elective	2	2 ~ 4	Bilingual teaching
數學教學媒體	Teaching Aids for Mathematics	Elective	3	3-1	Specialty Module for Mathematics and Teaching Enhancement
跨領域數學課程探索與設計	Exploration and Design of Interdisciplinary Mathematics Curriculum	Elective	2	3-2	
多元文化數學教育	Multicultural Mathematics Education	Elective	3	3-2	
數學史	History of Mathematics	Elective	3	4-1	
數學課程設計	Innovation Design in Mathematics	Elective	3	4-1	Specialty Module for Mathematics and Teaching Enhancement
數學教學創新設計	Creativity and Design in Mathematics Teaching	Elective	2	4-2	Specialty Module for Mathematics and Teaching Enhancement
(三) Free Elective Courses					
(1) Mathematics Courses					
數學導論	Introduction of Mathematics	Elective	3	1-1	Specialty Module for Mathematics and Teaching Enhancement
整數論	Number Theory	Elective	3	2-2	
拓樸學	Topology	Elective	3	3 ~ 4	
數值方法	Numerical Methods	Elective	3	3 ~ 4	
幾何學	Geometry	Elective	3	3 ~ 4	
線性規劃	Linear Programming	Elective	3	3 ~ 4	
作業研究	Operations Research	Elective	3	3 ~ 4	
複變數函數論	Complex Analysis	Elective	3	3 ~ 4	
實變數函數論	Real Analysis	Elective	3	3 ~ 4	
應用統計	Applied Statistics	Elective	3	4	
迴歸分析	Regression Analysis	Elective	3	4	

科目名稱	Course title	Required/ Elective	Credits	Grade	Remark
數理統計	Mathematical Statistics	Elective	3	4	
變異數分析	Analysis of Variance	Elective	3	4	
多變量分析	Multivariate Analysis	Elective	3	4	
時間序列	Time Series	Elective	3	4	
資料探勘	Data Mining	Elective	3	4	
(2) Mathematics Education Courses					
計算器在數學教學上的應用	Applying Calculator in Mathematics	Elective	2	1-2	
數學遊戲	Mathematics Games	Elective	2	2-2	
數學教育專題研究	Studies on Mathematics Education	Elective	2	3-1	
數學科科展作品研究	The Study of Works in Mathematics Exhibition	Elective	2	3-1	
中小學數學建模	Modeling in School Mathematics	Elective	2	3-1	
數學資優生解題思維	The Problem-solving Strategies of Mathematics-gifted Students	Elective	2	3-1	
數學資優生教材教法	Teaching Materials and Methods for Mathematics-gifted Students	Elective	2	3-2	
數學學習評量	Mathematics Learning Assessment	Elective	2	3-2	
數學美育教育與數學發現	Aesthetic Education of Mathematics and Mathematical Discovery	Elective	2	3-2	
中小學理財教育教學實務	Financial Education Teaching Practices for Elementary and Secondary Schools	Elective	3	3 ~ 4	
數學科普閱讀與寫作	Reading and Writing Skills in General Mathematics	Elective	2	4-1	
產業實務探索	Industry Practice and Exploration	Elective	3	4-1	
小說與電影中的數學思維	Mathematical Thinking in Fictions and Films	Elective	3	4-1	
數學奠基活動探索與設計	Exploration and Design of Mathematics Grounding Activities	Elective	2	4-1	
數學教學解題	Problem-Solving in Mathematical Teaching	Elective	2	4-2	
數學與數學教育哲學	Philosophies of Mathematics and Mathematics Education	Elective	3	4-2	
數學思考訓練	The Training of Mathematics Thinking	Elective	2	4-2	
(3) Information and Information Education Courses					
跨平台網頁設計	Cross-Platform Webpage Design	Elective	3	1-2	Must complete “Introduction to Computer Science” first ; pecialty Module for Information and Education Innovation
人工智慧在教育上的應用	Application of Artificial Intelligence in Education	Elective	2	1-2	
計算機網路	Computer Network	Elective	3	2-1	
遊戲程式設計	Game Programming	Elective	3	2-2	Must complete “Computer Programming” first ; Specialty Module for Information and Education Innovation

科目名稱	Course title	Required/ Elective	Credits	Grade	Remark
資料結構	Data Structure	Elective	3	2-2	Must complete “ <i>Computer Programming</i> ” first
演算法	Algorithm	Elective	3	3-1	Must complete “ <i>Computer Programming</i> ” first
人工智慧	Artificial Intelligence	Elective	3	3-1	Must complete “ <i>Computer Programming</i> ” first
數位學習系統	Digital Learning System	Elective	2	3-2	Specialty Module for Information and Education Innovation
數學軟體應用	Mathematical Software Application	Elective	2	3-2	
電腦輔助測驗與評量	Computer-Aided Test and Assessment	Elective	2	4-1	
資訊安全與倫理	Introduction to Information Security and Ethics	Elective	3	4-1	

科目名稱	Course title	Required/ Elective	Credits	Grade	Remark
Specialization Courses in Artificial Intelligence and Information Education Division (Required 38 credits, Elective 21 credits, Free Elective 11 credits, Total 70 credits)					
(一) Foundation Courses (38 credits are required)					
(1) Information Technology Courses					
計算機概論	Introduction to Computer Science	Required	3	1-1	
視覺化程式設計語言	Visual programming language	Required	3	1-2	
計算機網路	Computer Network	Required	3	2-1	
程式設計	Computer Programming	Required	3	2-1	Must complete “Visual Programming Language” first ; Specialty Module for Information and Education Innovation
資料庫系統	Database System	Required	3	2-1	Specialty Module for Information and Education Innovation
遊戲程式設計	Game Programming	Required	3	2-2	Must complete “Computer Programming” first ; Specialty Module for Information and Education Innovation
資料結構	Data Structure	Required	3	2-2	Must complete “Computer Programming” first
基礎電控應用與實務	Microelectronics Applications and Practices	Required	3	2-2	
(2) Information Education and Multimedia Courses					
跨平台網頁設計	Cross-Platform Webpage Design	Required	3	1-2	Must complete “Introduction to Computer Science” first ; Specialty Module for Information and Education Innovation
科技教育概論	Introduction to Technology Education	Required	2	1-2	
創意與設計思考	Creativity and Design Thinking	Required	3	2-1	
(3) Mathematics and Mathematics Education Courses					
線性代數(一)	Linear Algebra (I)	Required	3	1-1	Specialty Module for Mathematics and Teaching Enhancement
微積分(一)	Calculus (I)	Required	3	1-1	Specialty Module for Mathematics and Teaching Enhancement
(二) Core Courses (21 credits are required)					
《one course is required between “Information Technology Topics and Practice” and “Special Project and Practice in Artificial Intelligence Education”》					
《one course is required between “Inquiry and Practice in STEAM Education” and “Special Project and Practice in Learning Analytics”》					
(1) Information Technology Courses					
計算機與雲端應用	Computer and Cloud Applications	Elective	2	1-2	
人工智慧在教育上的應用	Application of Artificial Intelligence in Education	Elective	2	1-2	
資料科學程式設計	Data Science Programming	Elective	3	2-1	
作業系統	Operating System	Elective	3	3-1	

科目名稱	Course title	Required/ Elective	Credits	Grade	Remark
演算法	Algorithms	Elective	3	3-1	Must complete “ <i>Computer Programming</i> ” first
資訊科技專題與實務	Information Technology Topics and Practice	Elective	2	3-1	one course is required between this course and “ <i>Special Project and Practice in Artificial Intelligence Education</i> ”
STEAM 專題探究	Inquiry and Practice in STEAM Education	Elective	2	3-2	one course is required between this course and “ <i>Special Project and Practice in Learning Analytics</i> ”; Must complete “ <i>Information Technology Topics and Practice</i> ” first

(2) Information Education and Multimedia Courses

遊戲設計與運算思維	Game Design and Computational Thinking	Elective	2	1-2	
數位設計與製作	Digital Design and Production	Elective	3	2-2	Specialty Module for Information and Education Innovation
資訊教材教法	Instructional Materials and Practice on Teaching Computer Science	Elective	2	3-1	Specialty Module for Information and Education Innovation
科技領域教材教法	Teaching Materials and Methods of Technology Field	Elective	2	3-1	
人工智慧教育專題與實務	Special Project and Practice in Artificial Intelligence Education	Elective	2	3-1	one course is required between this course and “ <i>Information Technology Topics and Practice</i> ”
學習分析專題與實務	Special Project and Practice in Learning Analytics	Elective	2	3-2	one course is required between this course and “ <i>Inquiry and Practice in STEAM Education</i> ”; Must complete “ <i>Special Project and Practice in Artificial Intelligence Education</i> ” first
教育機器人	Educational Robot	Elective	3	3-2	Specialty Module for Information and Education Innovation
遊戲式學習	Game-based Learning	Elective	2	4-1	

(3) Mathematics and Mathematics Education Courses

離散數學	Discrete Mathematics	Elective	3	2-1	
機率論	Probability Theory	Elective	3	3-1	
統計學	Statistics	Elective	3	3-2	

(三) Free Elective Courses

(1) Information Technology Courses

數位邏輯設計	Digital Logic Design	Elective	2	2-1	
工程數學	Engineering Mathematics	Elective	3	2-2	
雲端資料庫應用	Cloud Database and Application	Elective	3	2-2	
混合實境科技	Mixed Reality Technology	Elective	3	2-2	
大數據分析套裝軟體	Big Data Analytics Tools & Software	Elective	2	2-2	
資料科學在教育上的應用	Application of Data Science in Education	Elective	2	2-2	

科目名稱	Course title	Required/ Elective	Credits	Grade	Remark
物聯網應用與實作	Development Practice of IOT	Elective	3	3-1	
人工智慧	Artificial Intelligence	Elective	3	3-1	Must complete “ <i>Computer Programming</i> ” first
網路應用實務	Network Application Practice	Elective	3	3-2	Specialty Module for Information and Education Innovation
計算機結構	Computer Architecture	Elective	3	3-2	
資訊安全與倫理	Introduction to Information Security and Ethics	Elective	3	4-1	
資料視覺化設計	Data Visualization and Design	Elective	3	4-1	
物件導向程式設計	Object Oriented Programming	Elective	3	4-1	Must complete “ <i>Introduction to Computer Science</i> ” first
創新科技與應用	Innovative Technology and Application	Elective	3	4-2	
資料探勘	Data Mining	Elective	3	4	
(2) Information Education and Multimedia Courses					
電腦動畫設計與製作	Design and Making in Computer Animation	Elective	3	2-1	
科技素養與倫理	Technology Literacy and Ethics	Elective	2	2-2	
多媒體理論與實務	Theory and Practice of Multimedia	Elective	2	2-2	
網站建置與管理	Website Construct and Management	Elective	3	2-2	Must complete “ <i>Introduction to Computer Science</i> ” first ; Specialty Module for Information and Education Innovation
科技創作與教學實務	Technology Creation and Teaching Practice	Elective	2	2-2	
數位學習系統	Digital Learning System	Elective	2	3-2	Specialty Module for Information and Education Innovation
動態網頁設計與製作	Dynamic Webpage Design and Making	Elective	3	3-2	
數學軟體應用	Mathematical Software Application	Elective	2	3-2	
數位學習策略	Digital Learning Strategies	Elective	3	3-2	
學習資料探索與分析	Learning Data Exploratory and Analysis	Elective	2	3-2	
行動與無所不在學習	Mobile Learning and Ubiquitous Learning	Elective	2	4-1	Specialty Module for Information and Education Innovation
電腦輔助測驗與評量	Computer-Aided Test and Assessment	Elective	2	4-1	
人工智慧產業發展與專案實務	Artificial Intelligence Industry Development and Thematic Practice	Elective	3	4-1	Must complete “ <i>Information Technology Topics and Practice</i> ” or “ <i>Special Project and Practice in Artificial Intelligence Education</i> ” first
產業實務探索	Industry Practice and Exploration	Elective	3	4-1	
數位影像處理與創作	Digital Photography Processing and Creation	Elective	3	4-1	
數位影音處理與設計	Digital Video and Audio Processing and Design	Elective	3	4-2	Specialty Module for Information and Education Innovation
電腦教學軟體評析	The evaluation on Computer Instructional Software	Elective	2	4-2	

科目名稱	Course title	Required/ Elective	Credits	Grade	Remark
(3) Mathematics and Mathematics Education Courses					
數學導論	Introduction of Mathematics	Elective	3	1-1	Specialty Module for Mathematics and Teaching Enhancement
線性代數(二)	Linear Algebra (II)	Elective	3	1-2	Must complete “ <i>Linear Algebra (I)</i> ” first
微積分(二)	Calculus (II)	Elective	3	1-2	Must complete “ <i>Calculus (I)</i> ” first
數學教育概論	Introduction to Mathematics Education	Elective	2	1-2	Specialty Module for Mathematics and Teaching Enhancement
數學概念發展	Conceptual Development in Mathematics	Elective	3	2-1	Specialty Module for Mathematics and Teaching Enhancement
代數	Algebra	Elective	3	2-2	
數學解題研究	Study of Problem Solving in Mathematics	Elective	2	2-2	Specialty Module for Mathematics and Teaching Enhancement
微分方程	Differential Equations	Elective	3	3-1	
數學教學與評量	Teaching and Assessment in Mathematics	Elective	2	3-1	Specialty Module for Mathematics and Teaching Enhancement
線性規劃	Linear Programming	Elective	3	3 ~ 4	
數學教學媒體	Teaching Aids for Mathematics	Elective	3	3-2	Specialty Module for Mathematics and Teaching Enhancement
數學課程研究	Studies on Mathematics Curriculum	Elective	3	3-2	Specialty Module for Mathematics and Teaching Enhancement