



課 綱 Course Outline  
資訊工程學系國際組

中文課程名稱 Course Name in Chinese	電腦對局理論				
英文課程名稱 Course Name in English	Theory of Computer Games				
科目代碼 Course Code	CSIEM0650	班 別 Degree	碩士班 Master' s		
修別 Type	選修 Elective	學分數 Credit(s)	3.0	時 數 Hour(s)	3.0
先修課程 Prerequisite					
課程目標 Course Objectives					
<p>本課程為教授人工智慧理論中的其中一個主要分支之電腦對局理論，使學生得以理解人工智慧在電腦對局理論中各項演算法的發展歷程，以及這些演算法如何應用或結合到不同的領域中。</p> <p>In this course, we will teach one of the main branches of artificial intelligence - the theory of computer games. This course will discuss the development of different algorithms in the theory of computer games and how these algorithms can be applied to other domains.</p>					
系教育目標 Dept.' s Education Objectives					
1	探究學科知識，善用專業技能 Explore academic knowledge, utilize professional skills.				
2	訓練評析思考，創新解決問題 Exercise analytical thinking, enhance creative problem solving skills.				
3	學習團隊分工，強化溝通表達 Participate in teamwork, strengthen communication skills.				
系專業能力 Basic Learning Outcomes				課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.' s Education Objectives	
A	統合資工知識技術之能力 Ability to integrate knowledge and technologies of computer science and information engineering.			●	
B	設計技術理論驗證實驗之能力 Ability to design and conduct science experiments and to validate hypotheses.			●	

C	資訊軟硬體設計開發之能力 Ability to design and develop computer software and hardware.	○
D	團隊專案開發之能力 Ability to design and develop team projects.	○
E	批判性思考與創新研發之能力 Ability of analytical thinking, creative research planning, and innovative development.	○

圖示說明 Illustration : ● 高度相關 Highly correlated ○ 中度相關 Moderately correlated

課程大綱  
Course Outline

1. 電腦對局概論 Introduction to theory of computer games
2. 單人對局與基礎演算法 Single-Player games and basic algorithm
3. 單人對局與進階演算法 Single-Player games and advance algorithm
4. 雙人對局概論 Introduction to two-player game
5. 雙人對局程式設計探討 Introduction to design two-player game playing program
6. Alpha-Beta 切捨演算法 Alpha-beta search algorithm
7. 斥候演算法 Scout search algorithm
8. 同型表與進階搜尋技巧 Transposition table and other techniques
9. 蒙地卡羅樹搜尋演算法之基礎 Basic Monte-Carlo search algorithm
10. 蒙地卡羅樹搜尋演算法的進階技巧 Advance Monte-Carlo search algorithm
11. 開局與殘局知識庫 Opening and endgame database
12. 對局系統實作考量 Implementation of game playing program

資源需求評估 (師資專長之聘任、儀器設備的配合 . . . 等)  
Resources Required (e.g. qualifications and expertise, instrument and equipment, etc.)

師資專長: 人工智慧、電腦對局、機器學習

Faculty expertise: Artificial Intelligence, Theory of Computer Game, Machine Learning

課程要求和教學方式之建議  
Course Requirements and Suggested Teaching Methods

Course Requirements and Suggested Teaching Methods

宜採理論與實務並重方式進行。

每一單元配合相關文獻閱讀，並撰寫相應報告或程式。

It is advisable to adopt a balanced approach between theory and practice.

Each unit should be accompanied by reference document reading and / or write corresponding report of programs.

其他  
Miscellaneous