國立東華大學

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	CSIEB0520	班 別 Degree	學士班 Bachelor’s		
修別 Type	學程 Program	學分數 Credit(s)	3.0	時 數 Hour(s)	3.0
先修課程 Prerequisite					

課程目標
Course Objectives

本課程為教授人工智慧理論中的其中一個主要分之電腦對局理論，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。
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.

系教育目標
Dept.’s Education Objectives

1	具備學科知識，養成專業技能 Acquire academic knowledge, develop professional skills
2	學習創新思考，分析解決問題 Inspire innovative thinking, increase analytical problem solving ability
3	培養團隊精神，學習溝通合作 Promote teamwork spirit, encourage coordination and cooperation
4	提昇專業倫理，承擔社會責任 Sublimate professional ethics, engage social responsibility
5	涵育人文素養，開拓國際視野 Cultivate humanities, broaden global perspectives

	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	資訊專業終身學習能力 Ability of lifetime learning in information profession	●

B	實驗驗證資訊科學能力 Ability of validate experimental result validation in information science field	●
C	資訊工具整合運用能力 Ability of integrated applications of information technology	●
D	資訊系統應用設計開發能力 Ability of information application system design and development	○
E	團隊合作溝通協調能力 Ability of teamwork, communication, and coordination	○
F	資通訊科技問題解決能力 Ability of problem solving regarding information and communication technology	○
G	瞭解資訊科技多元影響能力 Ability to understand information technology’s multiple influences	
H	肩負資訊人社會責任能力 Ability of bearing the social responsibilities being among information professionals	

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.斥侯演算法 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