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	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

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	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