107 學年度 第 3 學期 經濟與智慧計算概論 Introduction to Economics and Intelligent Computation 課程綱要

<table>
<tr><td colspan="3">課程名稱：
（中文）經濟與智慧計算概論
（英文）Introduction to Economics and Intelligent Computation</td><td>開課單位：
永久課號：</td><td>資管專</td></tr>
<tr><td colspan="5">授課教師：
陳柏安</td></tr>
<tr><td>學分數：</td><td>3.00</td><td>必 / 選修：</td><td>選修</td><td>開課年級：</td><td>*</td></tr>
<tr><td colspan="5">先修科目或先備能力：
(Optional) discrete mathematics, algorithms, or economics</td></tr>
<tr><td colspan="5">課程概述與目標：
Economics and computation is an emerging and active interdisciplinary research area, with contributions from theoretical computer science, economics, networking, artificial intelligence, operations research, and discrete mathematics. More specifically, “algorithmic game theory” and “learning in games” are more on the analysis side of equilibria, and “algorithmic mechanism design” and “social choice” are more on the engineering side. In this course, we aim to give an introduction and overview to the main results such as efficiency of equilibria and complexity of computing equilibria, learning to reach equilibria, and learning to design mechanisms.</td></tr>
<tr><td>教科書（請註明書名、作者、出版社、出版年等資訊）：</td><td colspan="4">Algorithmic Game Theory, edited by Noam Nisan, Tim Roughgarden, and Vijay V. Vazirani. 2007
Handbook of Computational Social Choice. 2016

References: Microeconomics, A. Mas-Colell, M. Whinston, and J. Green. 1995
Conference papers mainly from ACM EC, WINE, AAMAS, SAGT, STOC, FOCS, SODA, etc.
Journal papers mainly from GEB, IJGT, ACM TEAC, AIJ, JAIR, etc.</td></tr>
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課程大綱		分配時數				備註
單元主題	內容綱要	講授	示範	習作	其他	
Introduction	1. Introduction and Overview: Algorithms, Game theory and equilibria	9				
Price of Anarchy	1. Selfish routing in networks and other congestion games 2. Load balancing games 3. Network design with selfish agents 4. Other games	12				
Computing equilibria	Existence and complexity of computing equilibria	3				
Learning in games	Convergence of natural game play	6				
Mechanism design and social choice	1. Social choice theory and Algorithmic mechanism design 2. VCG mechanisms 3. Profit maximization: optimal mechanisms	12				
Midterm and final presentations					9	

教學要點概述：

1.學期作業、考試、評量

Evaluation and Grading Policy:

Homework: 4 assignments (40%)

Midterm+Final: reading and presentation (30%+30%)

2.教學方法及教學相關配合事項（如助教、網站或圖書及資料庫等）

師生晤談	排定時間	地點	聯絡方式
	By appointment	TBD	poanch@gmail.com

每週進度表

週次	上課日期	課程進度、內容、主題
1		Introduction and overview
2		Game theory and equilibria
3		Efficiency of equilibria
4		POA
5		POA
5		POA
6		POA
7		POA
8		Computing equilibria
9		Computing equilibria
10		Learning in games
11		Learning in games
12		Social Choice Theorem
13		Classical Results: VCG mechanisms
14		Applications
15		Classical Results: Myerson's optimal auctions
16		Classical Results: Myerson's optimal auctions
17		Classical Results: Myerson's optimal auctions
18		Classical Results: Myerson's optimal auctions

備註：

1.請遵守知慧財產權觀念及勿使用不法影印教科書。

2.其他欄包含參訪、專題演講等活動。