



課 綱 Course Outline

理工學院大數據科學國際學士班學士班

中文課程名稱 Course Name in Chinese	資料結構				
英文課程名稱 Course Name in English	Data Structures				
科目代碼 Course Code	DS__10090	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					
<p>A data structure is a way of organizing and storing data so that it can be processed efficiently by a computer program. The objectives of this course can be summarized as follows.</p> <p>●Understand the concept of abstract data types(ADT) for data modeling. ●Study different types of data structures and the algorithms that operate on them. ●Learn how to choose appropriate data structures and algorithms for problem solving. ●Learn to evaluate the benefits, costs and effectiveness of different data structures on a program. ●Learn how to design new data structures and algorithms if necessary. This is a lecture-oriented course with associated lab course. It is strongly recommended that you take both courses at the same time.</p> <p>The sample code will be presented in C++. It is therefore a prerequisite of this class to be familiar with the C++ programming language.</p>					
系教育目標 Dept.'s Education Objectives					
1	訓練嚴謹思考與推理能力。 to provide a solid training in rigorous thinking and reasoning,				
2	奠定資料科學理論與應用數學的基礎知識。 to establish well-founded background knowledge in data science and applied mathematics,				
3	具備跨領域學習能力。 to prepare the students for interdisciplinary study in the future.				

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	具備基本資料科學知識及邏輯推理能力。 have well-founded background in data science and logical reasoning,	●
B	具備機率、統計、資料科學及相關領域的知識與應用能力。 have the knowledge of probability , statistics , data science and the related fields, and their applications,	●
C	具備資料科學應用技能與團隊合作，解決問題能力。 be able to utilize data scientific skills for problem solving through cooperation and teamworking.	
圖示說明Illustration : ● 高度相關 Highly correlated ○ 中度相關 Moderately correlated		
課程大綱 Course Outline		
<p>The topics to be discussed include (**: will be covered if time allows):</p> <ol style="list-style-type: none"> 1.Data structures and abstract data types (ADTs) 2.C++ review 3.Algorithms and complexity 4.Arrays and strings 5.Stacks and queues 6.Linked lists (singly and doubly linked) 7.Trees (basic concepts, binary trees, search, heap) 8.Graphs (basic concepts, representations, search, shortest paths, spanning trees) 9.Internal sorting (insertion sort, quick sort, merge sort, heap sort, radix sort) 10.External sorting 11.Hashing 12.Priority queues** 13.Efficient search structures** 14.Advanced data structures** <p>Visit the class web page for detail information about the lecture schedule.</p>		
<p>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.)</p>		
Need computer lab for the lab part of the course.		
課程要求和教學方式之建議 Course Requirements and Suggested Teaching Methods		
Each unit should be accompanied by homework and programming exercises.		
其他 Miscellaneous		
1130306訂定		