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	資料結構				
英文課程名稱 Course Name in English	Data Structures				
科目代碼 Course Code	CSIEB0100	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

A data structure is a way of organizing and storing data so that it can be processed efficiently by a computer program. The CSIEB0100 Data Structures course is therefore about the organization, storage and effective processing of data for computer programs. The objectives of this course can be summarized as follows.

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 CSIE@0700.
It is strongly recommended that you take both courses at the same time.
The sample code will be presented in C++. It is therefore a prerequisite of this class to be familiar with the C++ programming language.

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

The topics to be discussed include (**: will be covered if time allows):

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**

Visit the class web page for detail information about the lecture schedule.
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.)
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