課程名稱 Course Title	(中文) 資料結構		
	(英文) Data Structure		
授課教師 Instructor	郁方老師	開課單位 Departments	資管系
學分數 Credit(s)	3 學分	修課對象 Target Students	學士班
課程目標 Course Objectives	Data structure (and algorithms) is known to be one of the most important courses to take to be a good programmer. This course focuses on the fundamentals of data structures and their implementations. Students come to understand and use data structures effectively by studying the method descriptions and applications. Students also get chance to learn how to develop Java applications using eclipse and java class library. At the end of this course, students should understand common data structures and algorithms, and be able to apply that understanding to implementing new data abstractions and using existing library components. Students should also be stronger programmers and feel comfortable programming in Java.		
課程大綱 Course Description	This course will cover both basic and advanced data structures and algorithms on their manipulations with the aim of offering students a solid technical training on programming. The key to be successful in this course is writing code on your own as much as possible. The (tentative) topics include: 1. A brief review of java programing, object oriented design, and analysis of algorithms. 2. Basic data structures: queues, stacks, linked lists, sequences, vectors, trees, heaps, and priority queues. 3. Advanced data structures: dictionaries, hash tables, maps, skip lists, search/balance/splay trees, directed/weighted graphs. 4. Fundamental algorithms: divide and conquer, merge/quick/bucket/radix sort, set partition, dynamic programing, greedy method, breadth-first search, depth-first search. 5. Advanced topics: topological sorting, pattern matching, tries, text compression, task scheduling, transitive closures,		

	strongly connected components, shortest paths, minimum spanning trees
上課進度 Weekly Course Schedule	September- Get ready to programming! Week 1: Opening: A brief overview of Java and eclipse [Lec0] [Lec1]- Text Book (TB) Chapter 1 Week 2: Introduction: Object-oriented design and abstract data type [Lec2]- TB Chapter 2 Week 3: Text/Pattern matching and Class project announcements [Lec3]- TB Chapter 12 - Project: Intelligent Searching-BeatGoogle! October – Introduce basic data structures and their implementations Week 4: Linked Lists [Lec4]- TB Chapter 3 and Chapter 6 Week 5: Queues and Stacks [Lec5]- TB Chapter 5 and Chapter 8 Week 6: Trees [Lec6]-TB Chapter 7 Week 7: Heaps [Lec7]　-TB Chapter 8 November – Introduce fundamental algorithms and their analyses Week 8: Analysis of Algorithms [Lec8][**Project Proposal**]- TB Chapter 4 Week 9: Divide and Conquer, Merge/Quick Sort, Recurrence Equations [Lec9]- TB Chapter 11 Week 10: **Midterm Exam (9:00-12:00 @ 四維堂)** -Lecture 1-9, TB Chapter 1-8, 1 Week 11: iOS app development December – Step on advance data structures Week 12: Dynamic Programming [Lec10]-TB Chapter 12 Week 13: Midterm review and Search Trees [Lec11]-TB Chapter 10 Week 14: Maps, Hash tables, Dictionaries and Skip Lists [Lec12]-TB Chapter 9 Week 15: Dictionaries and Skip Lists [Lec13] -TB Chapter 9 January – Graphs, demo and exam Week 16: Graph Theory I: Graphs and Graph Traversal [Lec14]

	-TB Chapter 13 Week 17: Graph Theory II: Strongly Connected Components, Transitive Closures and Shortest Paths [Lec15] --TB Chapter 15 Week 18: **Project Demo** (Demo Schedule in Lec 14) @MIS PC Class room (逸仙樓5F) and Final Exam Week 19: Final Exam (if needed) [**Project Code Upload**]
教學方式 Instructional Method	Lecture (75%) + Lab(25%)
課程要求 Course Requirements	Students need to attend the classes and will be assigned weekly HWs, a team project, and one final exam.
評量方式 Evaluation	Homework: Assignments/Labs: 40% (Weekly) Programming Project: 30% (1-4 students as a team. The project details will be announced at the end of Sep.) Exam: Final Exam: 30% (close book) Bonus: Class participation (10%)
教材及參考書目 Textbooks & Suggested Materials	Data Structures and Algorithms in Java 5th edition, by Michael T. Goodrich and Roberto Tamassia, John Wiley & Sons, Inc.
課程相關 連結網址 Course Website	http://soslab.nccu.edu.tw/Courses.html
備註 Remarks	