Tamkang University Academic Year 1012, 2nd Semester
Course Syllabus

Course Title	Computer Algorithms		Instructor	Hwei Jen Lin

Department/Year/Class		Course Details		
CSIE in Information Engineering /first year of master program/ A	■Required □Selective	□0（One Semester） □1（1st Semester） ■2（2nd Semester） □3（3rd Semester）	Credits	3

Aim of Education	Core Competences
1. Develop an ability to overcome difficulties and solve problems: Teach students to have abilities to identify, formulate, and solve engineering problems. They would be able to design and conduct experiments, as well as to analyze and interpret data. 2. Inspire independent thinking and creative innovation: By studying, understanding, induction and deduction, and information surveying through academic research papers, students would be able to propose their own research theme supported with creative innovation and practical implementation. 3. Establish the professional knowledge and practical skills of the network communication technology: Students not only have a solid background of information communication network through diversified engineering professional courses, paper study, seminar discussion and participation; students also have practical implementation skills through project implementation as well as essay writing. 4. Understand the international trends of information technology and industry: By creating an international learning and researching environment, and actively participate in international seminars/conferences, students can broaden international perspectives. Promote industry cooperation as well as alumni interaction to insight the global trends and changes of the industry. 5. Build a personality of 'Simplicity, Firmness, Perseverance, and Fulfillment', and possess the moral prestige and intelligence: Based on the university motto and governing principles, students are able to immerse themselves in an environment of both technology and humanity. Students would possess a personality of 'Simplicity, Firmness, Perseverance, and Fulfillment', as well as good quality in conduct and intelligence. 6. Develop a proactive and lifelong-learning attitude: In response to the rapid growth of knowledge, students are educated to be continuous self-growth, pursuing the truth, and have a proactive and lifelong learning attitude.	A. an ability to think independently, judge and analyze problems, and to enlighten innovative thinking to apply on research issues B. an attitude of facing difficulties and accepting challenges, and an ability to explore independently and to deduct and design methods and tools of solution C. an ability to apply information engineering knowledge and skills in professional fields, so as to be able to plan to analyze, design, fabricate, and integrate information systems. D. abilities in professional technical paper writing and verbal communication E. an ability to plan, write, execute, project, lead, and manage proposals F. an ability to use skills in a foreign language for learning and communication and a knowledge of contemporary global issues, so as to master global trends and change in industry G. an ability to understand the professional ethics and the responsibility of the community , and a responsible attitude to communication (with others), teamwork, coordination, and integrity H. the traits of simplicity, firmness, perseverance, fulfillment, and virtue and wisdom, and the spirit of serving the people I. a recognition of the importance of life-long learning and continuously cultivating the ability of self learning

Course Introduction (50 to 100 words)	This course teaches techniques for the design and analysis of efficient algorithms, emphasizing methods useful in practice. Topics covered include: asymptotic notation; sorting; search trees, heaps, and hashing; divide-and-conquer; dynamic programming; greedy algorithms; and graph algorithms.

The Relevance among Teaching Objectives, Objective Levels and Core Competences

I. Objective Levels (select applicable ones)：

(I) Cognitive Domain：C1 Remembering、C2 Understanding、C3 Applying、C4 Analyzing、C5 Evaluating、C6 Creating

(II) Psychomotor Domain：P1 Imitation、P2 Mechanism、P3 Independent Operation、P4 Linked Operation、P5 Automation、P6 Origination

(III) Affective Domain：A1 Receiving、A2 Responding、A3 Valuing、A4 Organizing、A5 Charaterizing、A6 Implementing

II. The Relevance among Teaching Objectives, Objective Levels and Core Competences：

(I)Determine the objective level(s) in any one of the three learning domains (cognitive, psychomotor, and affective) corresponding to the teaching objectives. Each objective should correspond to the objective level(s) of ONLY ONE of the three domains.

(II)If more than one objective levels are applicable for each learning domain, select the highest one only. (For example, if the objective levels for Cognitive Domain include C3, C5, and C6, select C6 only and fill it in the boxes below. The same rule applies to Psychomotor Domain and Affective Domain.)

(III)Determine the core competences that correspond to each teaching objective. Each objective may correspond to one or more core competences at a time. (For example, if one objective corresponds to three core competences: A, AD, and BEF, list all of the three in the box.)

Teaching objectives	Relevance	
	Objective Levels	Core Competences
1. Students will understand the content and concept of Algorithms.	C4	AB
2. Students will learn how to develop fundamental skills in designing and analyzing algorithms	C4	AB
3. Students will learn how to synthesize efficient algorithms in common engineering design situations.	C5	ABDFI
4		

Teaching Objectives, Teaching Methods and Assessment

Teaching Objectives	Teaching Methods	Assessment
1. Students will understand the content and concept of Algorithms.	lecture, simulation, problem solving	examinations, homework, participation, and attitude
2. Students will learn to develop fundamental skills in designing and analyzing algorithms	lecture, simulation, problem solving	examinations, homework, participation, and attitude
3. Students will learn how to synthesize efficient algorithms in common engineering design situations.	lecture, simulation, problem solving	examinations, homework, participation, and attitude
5		

This course has been designed to cultivate the following essential qualities in TKU students.

Essential Qualities of TKU Students	Description
□global perspectives	
□a vision for the future	翻譯建構中
□information literacy	

□ethical and moral principles
□independent thinking
□an awareness of healthy living
□effective teamwork
□an appreciation of the arts

Course Schedule

Week	Date	Subject/Topics	Note
1	2/19	Introduction	
2	2/26	Insertion sort, Running time	
3	3/5	Divide&Conquer, Recurrences	
4	3/12	Mergesort, Heapsort	
5	3/19	Quicksort, Sorting in Linear time	
6	3/26	Medians and Order Statistics	
7	4/2	Spring break	
8	4/9	Hash tables, Binary Search Trees	
9	4/16	Red-Black Trees	
10	4/23	Midterm Exam Week	
11	4/30	Augmented Data Structures	
12	5/7	Dynamic Programming	
13	5/14	Greedy Algorithms	
14	5/21	Amortized Analysis	
15	5/28	Elementary Graph Algorithms	
16	6/4	Minimum Spanning Trees	
17	6/11	Shortest Paths	
18	6/18	Final Exam Week	

Requirement	Make-up exams will only be given in the event of an emergency, and only I am informed *in advance*. Only homework turned in by the due date is guaranteed to be graded
Teaching Facility	■Computer ■Overhead Projector □Other （＿＿＿＿＿）
Textbook(s)	"Introduction to Algorithms" (3rd.) by Thomas Cormen
Suggested Readings	
Number of Assignments	8 (Filled in only for those courses that apply)
Grading Policy	Midterm exam 30%, final exam 30%, pop quizzes 20%, homework assignments 20%, participation & attitude +10% or -10%

Note	This syllabus may be uploaded at the website of Course Syllabus Management System at **http://info.ais.tku.edu.tw/csp** or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/index.asp. ※**Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**