

Tamkang University Academic Year 102, 2nd Semester Course Syllabus

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| Course Title | ALGORITHMS | Instructor | FU-YI HUNG |
| Course Class | TPIAB2A DIVISION OF SOFTWARE ENGINEERING, DEPARTMENT OF INNOVATIVE INFORMATION AND TECHNOLOGY, 2A | Details | <ul style="list-style-type: none"> ◆ Required ◆ One Semester ◆ 3 Credits |
| D e p a r t m e n t a l A i m o f E d u c a t i o n | | | |
| Cultivate professional talents in software engineering and communication technology. | | | |
| D e p a r t m e n t a l c o r e c o m p e t e n c e s | | | |
| <ul style="list-style-type: none"> A. Capability of computer program coding, process planning, and problem solving. B. Capability of applying basic mathematics and information technology related mathematics. C. Capability of applying knowledge of internet structure and protocol in communication system. D. Capability of data collecting and analyzing, and organizing software and hardware. E. Capability of understanding and integrating system structure for problem solving. F. Capability of system analyzing, modeling, and designing. G. Capability of management utilizing information technology system. | | | |
| Course Introduction | <p>This course provides an introduction to the design and analysis of algorithms. Course topics include: Fundamentals of the Analysis of Algorithm Efficiency, Divide-and-Conquer, Decrease-and-Conquer, Transform-and-Conquer, Space and Time Tradeoffs, Dynamic Programming, Greedy Technique, Iterative Improvement.</p> | | |
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The Relevance among Teaching Objectives, Objective Levels and Departmental 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 Departmental core competences :

- (i) Determine the objective level(s) in any one of the three learning domains (cognitive, psychomotor, and affective) corresponding to the teaching objective. 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 Departmental core competences that correspond to each teaching objective. Each objective may correspond to one or more Departmental core competences at a time. (For example, if one objective corresponds to three Departmental core competences: A,AD, and BEF, list all of the three in the box.)

| No. | Teaching Objectives | Relevance | |
|-----|--|------------------|-------------------------------|
| | | Objective Levels | Departmental core competences |
| 1 | To understand the fundamental properties of algorithms | C2 | ABD |
| 2 | To implement algorithms to solve practical problems by software design | C3 | ABD |
| 3 | To analyze the efficiency of algorithms | C4 | ABD |

Teaching Objectives, Teaching Methods and Assessment

| No. | Teaching Objectives | Teaching Methods | Assessment |
|-----|--|------------------|--------------|
| 1 | To understand the fundamental properties of algorithms | Lecture | Written test |
| 2 | To implement algorithms to solve practical problems by software design | Lecture | Written test |
| 3 | To analyze the efficiency of algorithms | Lecture | Written test |

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

| Essential Qualities of TKU Students | Description |
|---|---|
| ◇ A global perspective | Helping students develop a broader perspective from which to understand international affairs and global development. |
| ◇ Information literacy | Becoming adept at using information technology and learning the proper way to process information. |
| ◆ A vision for the future | Understanding self-growth, social change, and technological development so as to gain the skills necessary to bring about one's future vision. |
| ◇ Moral integrity | Learning how to interact with others, practicing empathy and caring for others, and constructing moral principles with which to solve ethical problems. |
| ◆ Independent thinking | Encouraging students to keenly observe and seek out the source of their problems, and to think logically and critically. |
| ◇ A cheerful attitude and healthy lifestyle | Raising an awareness of the fine balance between one's body and soul and the environment; helping students live a meaningful life. |
| ◇ A spirit of teamwork and dedication | Improving one's ability to communicate and cooperate so as to integrate resources, collaborate with others, and solve problems. |
| ◇ A sense of aesthetic appreciation | Equipping students with the ability to sense and appreciate aesthetic beauty, to express themselves clearly, and to enjoy the creative process. |

Course Schedule

| Week | Date | Subject/Topics | Note |
|------|--------------------------|--|------|
| 1 | 103/02/17 ~ 103/02/23 | Introduction | |
| 2 | 103/02/24 ~ 103/03/02 | Fundamentals of the Analysis of Algorithm Efficiency | |
| 3 | 103/03/03 ~ 103/03/09 | Fundamentals of the Analysis of Algorithm Efficiency | |
| 4 | 103/03/10 ~ 103/03/16 | Fundamentals of the Analysis of Algorithm Efficiency | |
| 5 | 103/03/17 ~ 103/03/23 | Brute Force | |
| 6 | 103/03/24 ~ 103/03/30 | Brute Force | |
| 7 | 103/03/31 ~ 103/04/06 | Divide-and-Conquer | |
| 8 | 103/04/07 ~ 103/04/13 | Divide-and-Conquer | |
| 9 | 103/04/14 ~ 103/04/20 | Decrease-and-Conquer | |
| 10 | 103/04/21 ~ 103/04/27 | Midterm Exam Week | |
| 11 | 103/04/28 ~ 103/05/04 | Decrease-and-Conquer | |
| 12 | 103/05/05 ~ 103/05/11 | Transform-and-Conquer | |

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|-------------------------|--|-----------------------|--|
| 13 | 103/05/12 ~ 103/05/18 | Transform-and-Conquer | |
| 14 | 103/05/19 ~ 103/05/25 | Dynamic Programming | |
| 15 | 103/05/26 ~ 103/06/01 | Dynamic Programming | |
| 16 | 103/06/02 ~ 103/06/08 | Greedy Technique | |
| 17 | 103/06/09 ~ 103/06/15 | Greedy Technique | |
| 18 | 103/06/16 ~ 103/06/22 | Final Exam Week | |
| Requirement | 考試舞弊者學期成績為零分，並且依照校規懲處。 | | |
| Teaching Facility | Computer, Projector | | |
| Textbook(s) | Introduction to the Design and Analysis of Algorithms, by Anany V. Levitin, Pearson Education Inc., 2nd Edition, 2007 | | |
| Reference(s) | Introduction to Algorithms, by T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein, McGraw-Hill, 3rd edition, 2009 | | |
| Number of Assignment(s) | (Filled in by assignment instructor only) | | |
| Grading Policy | ◆ Attendance : % ◆ Mark of Usual : 30.0 % ◆ Midterm Exam : 35.0 % ◆ Final Exam : 35.0 % ◆ Other < > : % | | |
| 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/CS/main.php . ※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications. | | |