

Algorithms

Course#: 901/39000.

Time/Location: Thursdays 2:20–5:20pm (**with potential extensions to 5:40pm**); BL-113

Instructor: Yao-Wen Chang (ywchang@cc.ee.ntu.edu.tw).

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Office Hours: Tuesday 5–6pm; other times by appointment.

Teaching Assistants: Xin-Wei Shih (raistlin@eda.ee.ntu.edu.tw) & Shih-Lun Huang (aaron@eda.ee.ntu.edu.tw); BL-406; Tel: 23635251 # 6406; office hours: 12:20-1:20 pm Wednesdays.

Prerequisites: data structures (or discrete mathematics).

Required Text: T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, *Introduction to Algorithms*, 2nd Ed., MIT Press/McGraw Hill, 2001. ISBN: 0-262-03293-7/0-07-013151-1.

Course Objective: Focuses on the *design and analysis* of algorithms and their applications, and develops problem-solving techniques.

Course Contents: Topics include

- Algorithmic fundamentals: mathematical foundations, growth of functions, recurrences (5 hrs)
- Sorting and order statistics (5 hrs)
- Data structures: heap, binary search trees, RB trees, disjoint sets (4 hrs)
- Advanced design and analysis techniques: dynamic programming, greedy algorithms, amortized analysis (11 hrs)
- Graph algorithms: graph representations, searching, minimum spanning trees, shortest paths, matching, network flow (14 hrs)
- NP-completeness, computational complexity, and approximation algorithms (6 hrs)
- General-purpose algorithms: computational geometry, branch and bound, and simulated annealing, as time permits.

Grading: Six homework assignments (+ in-class quizzes to be held on the due dates) 30%, three mini programming assignments 20% (all submissions will be checked for duplication; those with $\geq 50\%$ similarity will be penalized), two in-class tests (**November 5:** 18% + **January 14:** 32%), and bonuses for class participation. **Attention:** *The grades on homeworks, programming assignments, and tests are considered final one week after they have been handed back, so you should bring any questions to the grader's attention promptly.*

Homework: Students may discuss the homework problems with one another but must write up their solutions separately. Homework must be handed in at the *beginning* of the class on which it is due in order to avoid a late penalty. Late homeworks will incur a penalty of 20 percent of the total score per day for the first two days (Saturdays and Sundays included) and will not be accepted afterwards.

On-Line Resources: Lecture notes, homeworks/tests, sample solutions, grading information, and other course-related materials are available at <http://cc.ee.ntu.edu.tw/~ywchang/Courses/Alg/alg.html>.

Academic Honesty: Cheating is very uncivilized behavior and is to be avoided at all cost. Oral discussion about *homeworks* is not considered cheating. Copying someone else's homework/test or part of an homework/test is cheating. If cheating is discovered, all students involved will receive no credit for the homework/test, possibly an F grade for the course.