

COMP4030/6030: Design and Analysis of Algorithms – Fall 2025
Instructor: Dr. Vinhthuy Phan (vphan@memphis.edu, 678-1535)

Description: Asymptotic behavior of programs, basic paradigms in algorithm design; greedy, divide-and conquer, dynamic programming; analysis of efficiency and optimality of representative algorithms, including graph, pattern matching, numerical, randomized, and approximation algorithms; approaches to lower bound analysis; basic parallel algorithms. **PREREQUISITE:** COMP 2150 or 4001, and 2700 or permission of instructor.

Professional Conduct: Students are expected to conduct themselves in a professional manner. Each student will further be held accountable to The University of Memphis's code of conduct. The first misconduct results in a grade of 0. A repeated misconduct will likely result a failing grade for the course and report to the department and college.

Reference: <https://www.memphis.edu/osa/students/academic-misconduct.php>.

Attendance and Classroom Expectation: Students are expected to attend every lecture and participate in in-class activities and discussions.

Course Outcomes:

1. Analyze and identify the running time of iterative functions.
2. Analyze and identify the running time of recursive functions.
3. Design and evaluate algorithms using the divide and conquer strategy on linear data structures.
4. Design and evaluate algorithms using the divide and conquer strategy on tree-like structures.
5. Design solutions to store repeated computation to improve the running time efficiency of algorithms.
6. Design solutions to enumerate all possible candidates to select the correct solution.

Recommended textbooks:

- "Algorithms", by Dasgupta and Papadimitriou (PDF is available for free online)
- "Foundations of Algorithms", by Neapolitan, 5th edition.
- "Introduction to the Design and Analysis of Algorithms", by Levitin, 3rd edition.

Evaluation

	COMP 4030	COMP 6030
Attendance	5%	5%
Participation	15%	15%
Assignments	25%	25%
Midterm Exam	25%	25%
Final Exam	30%	30%

Topics:

1. Correctness of algorithms
2. Analysis of running time
3. Divide/decrease and conquer
4. Dynamic programming
5. Greedy
6. Backtracking
7. Branch and bound
8. Graph algorithms

Grading scale:

A ≥ 94 A- ≥ 90 B+ ≥ 86 B ≥ 83 B- ≥ 80 C+ ≥ 76 C ≥ 73 C- ≥ 70 D+ ≥ 60 D ≥ 50 F < 50

Special accommodation:

If you need special accommodation, please let the instructor know immediately.