

CS 325 – Analysis of Algorithms

Catalog Description: Recurrence relations, combinatorics, recursive algorithms, proofs of correctness.

Credits: 4 **Terms Offered:** Fall, Winter

Prerequisites: CS 261, MTH 232

Courses that require this as a prerequisite: CS 420, CS 475, CS 480

Structure: Three 50-minute lectures per week

Instructors: Paul Cull

Course Content:

- Recursive algorithms
- Using difference equations
- Inductive proofs of correctness
- Timing of algorithms
- Search of algorithms
- NP completeness
- Divide and conquer algorithms
- Heuristics for hard problems

Measurable Student Learning Outcomes:

)At the completion of the course, students will be able to...

1. **Define** O , Ω , and Θ in a rigorous way (Level 1; ABET Outcomes: a, j)
2. **Compute** the time complexity of polynomial-time and exponential-time iterative and recursive algorithms (Level 3; ABET Outcomes: A, B, j)
3. **Solve** simple difference equations (Level 3; ABET Outcomes: A, j)
4. **Implement** a recursive algorithm to solve a simple problem (Level 3; ABET Outcomes: C, j)
5. **Prove** the correctness of theorems using induction (Level 3; ABET Outcomes: A, J)
6. **Implement** a divide-and-conquer algorithm to solve a problem of intermediate difficulty (Level 3; ABET Outcomes: C, J)
7. **Implement** a polynomial-time heuristic algorithm to solve an NP-hard problem (Level 3; ABET Outcomes: C, J)
8. **Explain** how a problem is shown to be NP-complete (Level 2; ABET Outcomes: B, J)

Learning Resources:

- Cormen, Leiserson, Rivest, Stein, *Introduction to Algorithms* (MIT Press, 2001) (required)

Students with Disabilities:

Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the

term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.

Link to Statement of Expectations for Student Conduct:

<http://oregonstate.edu/admin/stucon/achon.htm>

Revised: 8/15/07