

## COURSE DESCRIPTION

Dept., Number	CSci 533	Course Title	Analysis of Algorithms
Semester hours	3	Course Coordinator	Stephen V. Rice, Assistant Professor

### Current Catalog Description

Introduction to the analysis of the efficiency of computer algorithms and concepts of computational complexity.

### Textbook

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. *Introduction to Algorithms*, 2<sup>nd</sup> edition MIT Press, 2001.

### References

### Course Outcomes

After successfully completing this course, students are able to:

1. analyze the running time of an algorithm and express it using asymptotic notation
2. specify a loop invariant and prove that it holds
3. describe the significance of polynomial vs. exponential time complexity of algorithms
4. select data structures for efficient computation
5. recognize and apply dynamic programming and greedy strategies

### Relationship between Course Outcomes and Program Outcomes

This is a course taken primarily by beginning computer science graduate students. It is sometimes taken by undergraduate computer science students as an elective to enrich their programs. The course outcomes contribute to the program outcomes as follows: (1) through (4) to (j), (5) to (i).

### Prerequisites by Topic

Fundamental concepts of algorithms and data structures and the associated programming techniques (CSci 433 or 502)

## Major Topics Covered in the Course

- loop invariants
- asymptotic notation
- recurrences
- searching and sorting
- dynamic programming
- greedy algorithms
- amortized analysis
- graph algorithms
- NP-completeness
- approximation algorithms

## Assessment Plan for the Course

This is an elective course offered approximately every two years. An offering typically has three examinations and three or more assignments, which are designed to assess Course Outcomes (1) to (5).

How Data in the Course are Used to Assess Program Outcomes (unless adequately covered already in the assessment discussion under Criterion 4)

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## Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms		2	Software design		
Data structures		1	Concepts of programming languages		