

## COURSE DESCRIPTION

Dept., Number	<b>CSCI 380</b>	Course Title	<b>Introduction to Analysis of Algorithms</b>
Semester hours	3	Course Coordinator	Terrence Fries
		URL (if any):	

### Current Catalog Description

(Writing Intensive) (Prereq: Grade of **C** or above in Computer Science 220) An introductory course in the analysis of algorithms, with emphasis on computational complexity including practical applications and the analysis of specific problems and algorithms, course investigates most commonly used algorithm design techniques and also introduces the notion of "hard" problems and approximate solutions. S, even years.

### Textbook

T. Cormen, C. Leiserson, R. Rivest, C. Stein, *Introduction to Algorithms*, McGraw-Hill, Second Edition, 2001

### References

Aho, Hopcroft, and Ullman, *The Design and Analysis of Computer Algorithms*, Addison-Wesley, 1974.

### Course Goals

1. To provide students with an understanding of the techniques used in the mathematical analysis of algorithms.
2. To provide students with an understanding of problem solving techniques used in algorithm design.
3. To provide students with an understanding of time and space requirements used in implementation.
4. To provide students with an understanding of techniques used in scientific writing.

### Prerequisites by Topic

1. Experience in programming in a high level language
2. Data Structures
3. Discrete mathematics

## Major Topics Covered in the Course

1. Big O, worst case analysis, divide and conquer (2 weeks)
2. Sorting algorithms (2 weeks)
3. Greedy methods, graphs (1 week)
4. Knapsack problem (1 week)
5. Strings, dynamic storage (2 weeks)
6. Dynamic programming (1 week)
8. NP analysis (2 weeks)
7. Equivalence relations (1 week)
9. Parallel algorithms (1 week)

Laboratory projects (specify number of weeks on each)

No fewer than six programming assignments, each of approximately two weeks duration.

Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Algorithms		2	Data Structures		
Software Design		1	Prog. Languages		
Comp. Arch.					

## Oral and Written Communications

Every student is required to submit at least \_\_\_\_\_ written reports (not including exams, tests, quizzes, or commented programs) of typically \_\_\_\_\_ pages and to make \_\_\_\_\_ oral presentations of typically \_\_\_\_\_ minute's duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

## Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

### Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Analysis of algorithms – 100% of the course

### Problem Analysis

Please describe the analysis experiences common to all course sections.

All laboratory assignments listed above require problem analysis.

### Solution Design

Please describe the design experiences common to all course sections.

All laboratory assignments listed above require formal design descriptions.