

COURSE DESCRIPTION

Department and Course Number	CS 303	Course Coordinator	Sloan
Course Title	Algorithms and Data Structures	Total Credits	4

Current Catalog Description

Efficient design of data structures, recursive algorithms, algorithms for sorting and searching, complexity analysis of algorithms, applications of algorithms and data structures in problems, state spaces, and search strategies in artificial intelligence Laboratory emphasizes object-oriented approach.

Textbooks

Algorithms in Java, Parts 1-4 and Algorithms in Java, Part 5, 3rd ed., by Robert Sedgewick, Addison-Wesley, 2003.

References *None*

Course Goals

Provide a solid foundation in the Design and Analysis of Algorithms, while pushing more deeply into Data Structures topics. This course is a pre-requisite for most higher level CS courses.

Prerequisites by Topic

Object Oriented Design and Discrete Structures with “C” or better in both

Major Topics Covered in the Course

Math review, review of the programming process, Algorithm Analysis - $O()$, List, Stacks, Queues, Trees, Hashing, Priority Queues, Heaps, Sorting, Sets, Graphs, Algorithm Design Techniques, Advanced Topics (as time allows).

This course is accompanied by a laboratory. The class work will be largely language independent and concentrate on design and analysis. The laboratory will concentrate on practical application, with many programming exercises.

Laboratory projects (specify number of weeks on each)

7 Programming projects – 2 weeks each.

Estimate CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	<u>20</u>	_____	Computer Organization and Architecture	_____	_____
Algorithms Software Design	<u>20</u>	_____	Concepts of Programming Languages	_____	_____

Oral and Written Communications

None

Social and Ethical Issues

None

Theoretical Content

90% of the class is devoted to the theory and practice of: Algorithm Analysis - $O()$, List, Stacks, Queues, Trees, Hashing, Priority Queues, Heaps, Sorting, Sets, Graphs, Algorithm Design Techniques

Problem Analysis

Written and programming assignments.

Solution Design

Programming assignments.