

COURSE SPECIFICATION

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	Course Title	B Data Structures and Algorithm Analysis B			
2.	Originating Department	Department of Computer Science and Engineering			
3.	Course Code	CS203B			
4.	Credit Value	3			
5.	Course Type	Major Foundational Courses			
6.	Semester	Fall			
7.	Teaching Language	English			
8.	Instructor(s), Affiliation& Contact For team teaching, please list all instructors	<div style="text-align: right;">luozw@sustech.edu.cn</div> Zongwei Luo, Associate Professor, Department of Computer Science and Engineering, luozw@sustech.edu.cn			
9.	Tutor/TA(s), Contact	<div style="text-align: right;">hucf@sustech.edu.cn</div> Chunfeng Hu, Teaching laboratory technician, Department of Computer Science and Engineering, hucf@sustech.edu.cn			
10.	Maximum Enrolment				
11.	Delivery Method	()			
		/ /	/	()	
		Lectures	Tutorials	Lab/Practical	Other Please specify
		32		32	
	Credit Hours				64

12. Pre-requisites or Other Academic Requirements	CS102A	A Introduction to Computer Programming A
13. Courses for which this course is a pre-requisite		
14. Cross-listing Dept.		

SYLLABUS

15. Course Objectives

In this course, we will study the fundamental data structures, and basic algorithms analysis methods. Topics to be covered include array, linked list, queue, stack, searching in ordered lists, sorting, priority queues, binary search trees, and fundamental graph algorithms. In addition, the algorithm analysis (i.e., time complexity, space complexity) methods also will be introduced in this course. Such knowledge will help non-computer science students in their future study.

16. Learning Outcomes

After completing this course, students will have acquired the following knowledge and skills:

- 1.
- 2.
- 3.
- 4.
1. Students will be familiar with the fundamentals of data structures. .
2. Students will be familiar with basic algorithms analysis methods.
3. Students will be able to select appropriate data structures for solving simple computing problems.
4. Students will be able to design simple algorithms with appropriate data structures and analyse their performance.

17.

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

[Lab 1]

[Lab 2]

[Lab 3]

[Lab 4]

[Lab 5]

1

[Lab 6]

2

[Lab 7]

[Lab 8]

[Lab 9]

[Lab 10]

[Lab 11]

1

[Lab 12]

2

[Lab 13]

3

[Lab 14]

[Lab 15]

[Lab 16]

- Week 1. Introduction
- Introduction to data structure and algorithm analysis

[Lab 1] Introduction to Homework and lab

- Week 2. Basics of algorithms analysis
- Basic mathematics tools for algorithms analysis

[Lab 2] Homework and lab for algorithm analysis

- Week 3. Lists

- List definition, representation and operations

[Lab 3] Homework and lab for list construction and operations

- Week 4. Stack
- Stack definition, representation and operations

[Lab 4] Homework and lab for stack construction and operations

- Week 5. Queue
- Queue definition, representation and operations

[Lab 5] Homework and lab for queue construction and operations

- Week 6. String (1)
- String definition, logical and storage structure

[Lab 6] Homework and lab for string construction

- Week 7. String (2)
- String operations and matching algorithms

[Lab 7] Homework and lab for string matching

- Week 8. Mid-term test
- Test

[Lab 8] Project assignment

- Week 9. Tree
- Tree definition, representation and mapping from different representations

[Lab 9] Homework and lab for tree construction and operations

- Week 10. Binary tree
- Binary tree definition, operations and traversal

[Lab 10] Homework and lab for binary tree construction, operations and traversal

- Week 11. Priority queue
- Priority queue definition, representation and operations

[Lab 11] Homework and lab for priority queue construction and operations

- Week 12. Graph algorithms (1)
- Graph definition and representation

[Lab 12] Homework and lab for graph construction

- Week 13. Graph algorithms (2)
- Graph shortest path algorithms

[Lab 13] Homework and lab for shortest path

- Week 14. Graph algorithms (3)
- Network flow problems

[Lab 14] Homework and lab for network flow problems

- Week 15. Sorting
- Insertion sort, shell shorting

[Lab 15] Homework and lab for implementation insertion/shell sorting

- Week 16. Sorting
- Quick sort, basket sort

[Lab 16] Homework and lab for implementing quick/basket sorting

18. Textbook and Supplementary Readings

1. Data structures and algorithm analysis in Java, Mark Allen Weiss, 3rd edition,
2. Master algorithms with C, Kyle Loudon, O'Reilly

ASSESSMENT

19.

Type of Assessment	Time	% of final score	Penalty	Notes
Attendance		10%		
Class Performance				
Quiz		10%		
Projects		20%		
Assignments				
Mid-Term Test		30%		
Final Exam		30%		
Final Presentation				

**Others (The
above may be
modified as
necessary)**

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20.

GRADING SYSTEM

A.	Letter Grading
B.	/ Pass/Fail Grading

REVIEW AND APPROVAL

21.

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This Course has been approved by the following person or committee of authority

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