



浙江大學

**COMP523**

**Data Structures & Algorithms**

# COMP523

## Data Structures & Algorithms

### **Instructor Contact Details**

Lecturer-in-charge: TBA

Email: wlwyxy\_29@zju.edu.cn

Office location: Huajiachi Campus, Zhejiang University

Consultation Times: to be announced, and by appointment

### **Teaching Times and Locations**

The Time and Location: TBA, Huajiachi Campus, Zhejiang University

Lecture sessions include lectures, seminars, field trip(s) as well as in-class activities.

### **Academic Level**

Undergraduate

### **Units of Credit**

The course is worth 6 units of credit

### **Contact Hours**

The course contains a total of 53 contact hours, which consists of an orientation meeting, 13 lecturing seminars, a revision day, a field trip and a final exam. Each seminar is 180 minutes in length, while the field trip is 300 minutes and the final exam costs 120 minutes. Students will receive an official transcript which is issued by Zhejiang University when completing this course.

### **Credit Hours**

The number of credit hours of this course equals to the credits of a standard semester-long Australian university course.

### **Course Description:**

This course is giving a brief understanding of data structures and algorithms and how these can be employed effectively in the design of software systems. It is an important course in covering a range of core data structures and algorithms that will be used in context in later courses. You explore these ideas in lectures, tutorials, lab classes, and assignments. Assessment involves labs, tutorials, practical lab exams, a practical final exam, and a theory exam. At the end of the course, we want you to be a solid programmer, with knowledge of a range of useful data structures and programming techniques, capable of building significant software systems in a team environment, and ready to continue with further specialised

### **Prerequisite:**

N/A

### **Learning Resources**

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms, Third Edition, MIT Press.

### **Learning Objectives**

By the end of this course you should be able to:

- Skills in performing analysis of given recursive and iterative algorithms.
- Understanding and performing simple proofs of algorithmic complexity and correctness.
- An ability to understand and derive recurrences describing algorithms and properties of data structures.
- An understanding of the implementation and efficiency of a range of data structures including, trees, binary heaps, hash-tables and graphs.
- An understanding of a variety of well-known algorithms on some of the data structures presented.

- The ability to implement and use these algorithms in code.
- A foundational understanding of intractability. An understanding of proof techniques for NP-Completeness.
- An ability to solve new analytic and algorithmic problems.

**Course Delivery:**

The following course will be taught in English and it will comprise of lectures, tutorials, projects, presentations and group activities. In addition to these, there will also be guest speakers and optional field trips available for students who would like to enhance their learning experience. The course will be delivered within 13 sessions, with each session totaling 3 hours-inclusive of both the lecture and tutorial. These sessions will be running during weekdays, Monday to Friday. Students are expected to engage in class discussions and work cooperatively during group work.

**Topics and Course Schedule:**

<b>Topic</b>	<b>Activities</b>
<b>Orientation</b>	
<b>Introduction to the course</b>	Lecture; Tutorial
<b>Analysis of ADT (multiple) implementations Trees, Binary Search Trees (BST)</b>	Lecture; Tutorial
<b>Balanced Trees, Search Tree Algorithms</b>	Lecture; Tutorial
<b>Graph ADT, Graph Algorithms (1)</b>	Lecture; Tutorial
<b>Graph Algorithms (2)</b>	Lecture; Tutorial
<b>Seminar</b>	

<b>Hashing, Heaps</b>	Lecture; Tutorial
<b>Generic ADTs in C</b>	Lecture; Tutorial
<b>Midterm exam</b>	
<b>Sorting (1)</b>	Lecture; Tutorial
<b>Sorting (2)</b>	Lecture; Tutorial
<b>LABS</b>	Lecture; Tutorial
<b>Text processing algorithms</b>	Lecture; Tutorial
<b>Course Review</b>	Lecture; Tutorial
<b>Review Exercises</b>	Lecture; Tutorial
<b>Revision</b>	
<b>Final exam</b>	

**Assessments:**

Assignment	30%
Mid-term examination	30%
Labs	10%
Final exam	30%

**Grade Descriptors:**

HD	High Distinction	85-100
D	Distinction	75-84
Cr	Credit	65-74
P	Pass	50-64

F	Fail	0-49
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### **High Distinction 85-100**

Treatment of material evidences an advanced synthesis of ideas

Demonstration of initiative, complex understanding and analysis

Work is well-written and stylistically sophisticated, including appropriate referencing, clarity, and some creativity where appropriate

All criteria addressed to a high level

### **Distinction 75-84**

Treatment of material evidences an advanced understanding of ideas

Demonstration of initiative, complex understanding and analysis

Work is well-written and stylistically strong

All criteria addressed strongly

### **Credit 65-74**

Treatment of material displays a good understanding of ideas

Work is well-written and stylistically sound, with a minimum of syntactical errors

All criteria addressed clearly

### **Pass 50-64**

Treatment of material indicates a satisfactory understanding of ideas

Work is adequately written, with some syntactical errors

Most criteria addressed adequately

### **Fail 0-49**

Treatment of ideas indicates an inadequate understanding of ideas

Written style inappropriate to task; major problems with expression

Most criteria not clearly or adequately addressed

### **Academic Integrity**

Students are expected to uphold the university's academic honesty principles which are an integral part of the university's core values and principles. If a student fails to observe the acceptable standards of academic honesty, they could attract penalties and even disqualification from the course in more serious circumstances. Students are responsible for

knowing and observing accepted principles of research, writing and any other task which they are required to complete.

Academic dishonesty or cheating includes acts of plagiarism, misrepresentation, fabrication, failure to reference materials used properly and forgery. These may include, but are not limited to: claiming the work of others as your own, deliberately applying false and inaccurate information, copying the work of others in part or whole, allowing others in the course to copy your work in part or whole, failing to appropriately acknowledge the work of other scholars/authors through acceptable referencing standards, purchasing papers or writing papers for other students and submitting the same paper twice for the same subject.

This Academic Integrity policy applies to all students of the Zhejiang University in all programmes of study, including non-graduating students. It is to reinforce the University's commitment to maintain integrity and honesty in all academic activities of the University community.

### **Policy**

- The foundation of good academic work is honesty. Maintaining academic integrity upholds the standards of the University.
- The responsibility for maintaining integrity in all the activities of the academic community lies with the students as well as the faculty and the University. Everyone in this community must work together to ensure that the values of truth, trust and justice are upheld.
- Academic dishonesty affects the University's reputation and devalues the degrees offered.
- The University will impose serious penalties on students who are found to have violated this Policy. The following penalties may be imposed:
  - Expulsion;
  - Suspension;
  - Zero mark/fail grade;
  - Marking down;
  - Re-doing/re-submitting of assignments or reports; and
  - Verbal or written warning.