Nanchang University
CS33: Data Structures And Algorithms

Credit: 4

Contact Hours

This course is composed of 24 lecture sessions, 3 tutorial sessions and 9 office contact hours. Each lecture session takes 2 contact hours in length; each tutorial session takes 3 contact hours in length;There will be a Q-A review session(3 contact hours) and Final Exam (3 contact hours)at the end of this term. This course has 72 contact hours in total.

Course Description

This unit studies the specification, implementation and time-and-space performance of a range of commonly used ADTs and corresponding algorithms in an object-oriented setting.Students develop an understanding of the fundamentals of data structure selection, analysis, design, implementation and application, and in-depth technical knowledge of key abstract data types; the ability to undertake problem identification, formulation and solution using ADT components for storing and retrieving data: and the ability to both implement their own ADT where necessary, and select and use appropriate ADTs for object-oriented libraries where suitable Students gain in-depth technical competence in program design, implementation and analysis and learn techniques for problem identification, formulation and solution.

Required Textbook

Data Structures and Algorithm Analysis in C++, Third Edition 624pages
Author: Dr. Clifford A. Shaffer
Published by: Dover Publications
ISBN: 048648582X

Learning objectives

After successfully completing this course, students are expected to :
1)Design data structures and algorithms and analyse the performance of different data structures and algorithms and compare them systematically and rigorously;
2)Write concise technical reports;
3)Demonstrate critical thinking and information literacy;
4)Understand the evolution of the discipline including its history, philosophy and theories;
5)Understand the discourse conventions of the discipline;
6)Understand common and important data structures and algorithms in the computing

discipline;

7)Implement a range of data structures and algorithms in a high-level programming language;

8)Select and apply existing data structures and algorithms from pre-build software libraries.

Grading

- Participation   10%
- Quizzes   20%
- Midterm Exam   30%
- Final Exam   40%

A+	96-100	A	90-95	A-	85-89
B+	82-84	B	78-81	B-	75-77
C+	71-74	C	66-70	C-	62-65
D	60-61	F	< 60		

Course Schedule

The course has 24 class sessions in total. All sessions are 2 contact hours in length. At the end of this term, there will be a Q-A review session(3 contact hours) and Final Exam (3 contact hours).

Note: the course outline and required readings are subject to change.

Class1:

Introduction to the course, get familiar with the syllabus, attending policy.

Class2:

Data Structures and Algorithms.

Class3:

Mathematical Preliminaries.

Class4:

Algorithm Analysis.

Class5:

Fundamental Data Structures.

Class6:

Non-Binary Trees.

Class7:

Internal Sorting and Group Report about Structure.

Class8:

File Processing and External Sorting.

Class9:
Searching and Indexing.

Class10:
Control Flow and Quiz 1.

Class11:
Advanced Data Structures and Graphs.

Class12:
Lists and Arrays Revisited and Middle-Term Test.

Class13:
Advanced Tree Structures and Classic Theory of Algorithms.

Class14:
Analysis Techniques.

Class15:
Lower Bounds.

Class16:
Patterns of Algorithms.

Class17:
Limits to Computation and Group Report About Algorithms.

Class18:
Low-Level Arrays and Quiz 2.

Class19:
Dynamic Arrays and Amortization.

Class20:
Efficiency of Python's Sequence Types.

Class21:
Using Array-Based Sequences.

Class22:
Classic Python's Sequence Types.

Class23:

Review of the course ,reply to confusions and individual report.

Class24:
Group Discussion: Date structure in the future.

Attending Policy

Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.

Policy on "Late Withdrawals"

In accordance with university policy, appeals for late withdrawal will be approved ONLY in case of medical emergency and similar crises.

Academic Honesty

Nanchang University expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

General Expectations:

Students are expected to:
— Attend all classes and be responsible for all materials covered in class and otherwise assigned;
— Complete the day's required reading and assignments before class;
— Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading;
— Participate in class discussions and complete required written work on time;
— Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period;
— While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.

Special Needs or Assistance

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.