

COURSE SYLLABUS

CSC10004 – Data structures and algorithms

1. GENERAL INFORMATION

Course name:	Data structures and algorithms
Course name (in Vietnamese):	Cấu trúc dữ liệu và giải thuật
Course ID:	CSC10004
Knowledge block:	
Number of credits:	4
Credit hours for theory:	45
Credit hours for practice:	30
Credit hours for self-study:	90
Prerequisite:	Programming Fundamentals Object Oriented Programming
Prior-course:	
Instructors:	Bùi Tiến Lên Lê Ngọc Thành Trương Tấn Khoa Tạ Việt Phương

2. COURSE DESCRIPTION

The course is designed to provide students applications of programming techniques, introducing the fundamental concepts of data structures and algorithms. Topics include fundamental data structures (including stacks, queues, linked lists, hash tables, trees, and graphs), recursion, sorting and searching algorithms, as well as algorithmic analysis

3. COURSE GOALS

At the end of the course, students are able to

ID	Description	Program LOs
G1	Understand and Implement sorting algorithms	
G2	Understand and Implement searching algorithms	
G3	Understand and Implement data structures	

4. TEACHING PLAN

ID	Topic	Course outcomes	Teaching/Learning Activities (samples)
1	Review and overview Data abstraction		Lecturing Demonstration, Q&A
2	Algorithm analysis		Lecturing Demonstration, Q&A
3	Sorting algorithms		Lecturing Demonstration, Q&A
4	Tree introduction		Lecturing Demonstration, Q&A
5	Binary search and balanced trees		Lecturing Demonstration, Q&A
6	Muliway trees and b-trees		Lecturing Demonstration, Q&A
7	Priority queue		Lecturing Demonstration, Q&A
8	Hash table		Lecturing Demonstration, Q&A

9	Graph introduction		Lecturing Demonstration, Q&A
10	Graph algorithms		Lecturing Demonstration, Q&A
11	Review		Q&A

For the practical laboratory work, there are 10 weeks which cover similar topics as it goes in the theory class. Each week, teaching assistants will explain and demonstrate key ideas on the corresponding topic and ask students to do their lab exercises either on computer in the lab or at home. All the lab work submitted will be graded. There would be a final exam for lab work.

5. ASSESSMENTS

ID	Name	Description	Ratio (%)
1	Lab		40%
2	Quiz/Assignment		20%
3	Midterm	In-class exam	
4	Final		40%
5	Activities		+5%

6. RESOURCES

Textbooks

- Walls and Mirrors, “Data Abstraction & Problem Solving with C++”, Pearson, 6th, 2013

Others

- Thomas H. Cormen and Charles E. Leiserson and Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, The MIT Press, 3rd, 2009

7. GENERAL REGULATIONS & POLICIES

- All students are responsible for reading and following strictly the regulations and policies of the school and university.



- Students who are absent for more than 3 theory sessions are not allowed to take the exams.
- For any kind of cheating and plagiarism, students will be graded 0 for the course. The incident is then submitted to the school and university for further review.
- Students are encouraged to form study groups to discuss on the topics. However, individual work must be done and submitted on your own.