	VIETNAM NATIONAL UNIVERSITY OF HO CHI MINH CITY UNIVERSITY OF NATURAL SCIENCES **FACULTY OF INFORMATION TECHNOLOGY**

COURSE SYLLABUS

Course Code: TH105

Title: Data Structures 2

Credits: 4

Workload:

Lecture hours:	**3** periods * **15** weeks = **45** periods
Laboratory hours:	**2** periods * **15** weeks = **30** periods
Preparative hours:	**2** periods * **15** weeks = **30** periods

Prerequisites: TH102 - Data structures 1

Course Objectives:

This course builds upon the foundation formed in TH102 and extends the study of data structures and algorithms in TH102 by studying more complex data structures and algorithms. The course aims to give students the confidence to exploit complex data structures and algorithms in their programs.

Main Text: N/A

References:

- *Algorithms + Data Structure = Programs*
  N. Wirth, 1981
- *Data structures and Algorithm Analysis in C (Second Edition)*
  Mark Allen Weiss -- Addison-Wesley, 1991
- *The Art of Computer Programming, Vol.3, Searching and Sorting*
  D.E.Knuth – Addison Wesley, 1973
- *Data Compression*
  David Salomon, Springer, 1998
- *Handbook of Algorithms and Data Structures, in Pascal and C*
  G. Gonnet and R. Baeza-Yates -Addison-Wesley, 1991
- *Introduction to Algorithms,* T.H.Cormen, C.L. Leiserson, R.L. Rivest, C. Stein, (2nd eds), MIT Press.

Course Outline:

Chapter 1 Overview about file
- 1.1 Definition
- 1.2 File classification
  - 1.2.1 Sequential file organization
  - 1.2.2 Index file organization
  - 1.2.3 The organization of PCX, BMP, DBF files
- 1.3 General principles of file processing

Chapter 2 Algorithm development with Files

- 2.1 Building methods/procedures for searching, adding, removing, appending
  - 2.1.1 Sequential file
  - 2.1.2 Index file
  - 2.1.3 Analyzing the structure of the headers of specific file formats (PCX, BMP, and DBF) and accessing file content
- 2.2 Sorting on Files
  - 2.2.1 Sorting by using direct merging method
  - 2.2.2 Sorting by using natural merging method
  - 2.2.3 Sorting by *n* balanced runs

Chapter 3 B-Tree

- 3.1 B-Tree's characteristics
- 3.2 An example of B-Tree
  - 3.2.1 Algorithms for searching, adding, removing an element , saving and loading B-Tree
- 3.3 Introduction to BB-Tree and applications

Chapter 4 Hash table

- 4.1 Introduction and purposes
- 4.2 Some examples of hash table
- 4.3 Key changing methods
- 4.4 Some principles to choose appropriate hash table and hash functions
- 4.5 Hashing by using linked-list, combined hash table
- 4.6 Hashing by using opened address method (linear, or double hash)

Grading Final exam : 70%

Assignments: 30%