

Course specification

(2102 Data structures)

Faculty: HICIT

Programme(s) on which the course is given: Under graduate program in Computer Science

Major or minor element of programme: Compulsory

Department offering the programme: Department of Computer Science

Department offering the course: Department of Computer Science

Year / Class: 2nd Year – 1st semester

Date of specification approval: 22/9/2015

A- Basic Information

Title: Data structures

Code: 2102

Weekly Hours:

Lecture : 3

Exercise: 2

Practical: 2

Total: 7

B- Professional Information

1- Course Objectives:

The objective of CS2102 is to teach ways and techniques of efficiently organizing and manipulating data in main memory.

After completing this course, the student should be able to:

- b. Build and manipulate linear and non-linear data structures, including stacks, queues, linked lists, trees, and graphs.
 - a. Sort, and search data.
 - c. Choose the appropriate data structure to use in solving typical computer science problems.

2- Program ILOs Covered by Course

Program Intended Learning Outcomes

Knowledge and understanding	Intellectual Skills	Professional and practical skills	General and Transferable skills
a2, a13, a14, a21	b1, b2, b3	c1, c5, c6, c16	d5

3 - Intended learning outcomes of course (ILOs)

After completing this course, the student should be able to:

a: Knowledge and Understanding

- a1. Understand Programming concepts, Object Oriented concepts and different Data Structures.
- a2. Understand the problem and use skills for analysis of programming problems and selection of algorithms.

b: Intellectual skills

- b1. Compare and analyze algorithms as fundamental tools of data structures and program design.
- b2. Analyze and breakdown the tasks into understandable and manageable subtasks.
- b3. Explain clearly and precisely stated solutions for problems.

c: Professional and practical skills

- c1) use case studies to show how all the tools are used together to build a complete program.
- c2) Apply methods to reduce program errors, verify used algorithms, and efficiently debug programs.
- c3) Operate on large projects.

d: General and transferable skills

- d1) Join a team to produce reports.
- d2) Cope with a team to find a solution for practical problems and projects.
- d3) Write structural reports.

4- Contents

Topic	Hours	Lec.	Exc/Lab
Introduction to Data Structures	7	3	4
Recursion	7	3	4
Arrays, Pointers, and Structures	14	6	8
Linked lists	14	6	8
Stacks	7	3	4
Queues.	7	3	4
Trees	14	6	8
Graphs.	10	6	4
Course project	11	3	8

5- Teaching and learning methods

- 5.1 Lectures
- 5.2 Tutorial Exercises
- 5.3 Practical Lab
- 5.4 Discussions.

6 -Student assessment methods

- 6.1 Midterm Exam: To assess the knowledge and understanding achieved by the student during the previous weeks.
- 6.2 Final Exam: To evaluate what the student gain at the end of the course, and to assess: the knowledge and understanding, general skills, and intellectual skills.
- 6.3 Course Project: To allow students work in team, and to evaluate knowledge, understanding, intellectual, and transferable skills.
- 6.4 Course Work & Quizzes: To keep the student always in the course, and to evaluate knowledge, understanding, intellectual, and transferable skills.
- 6.5 Practical Exam: to measure the ability of students to design and implement a software program.

Assessment Schedule

Assessment	Week #
Mid Term Exam	8
Final Exam	16
Course Project	3-14
Course Work & Quizzes	2-14
Practical Exam	15

Assessment Weight

Assessment	Weight %
Mid Term Exam	5%
Final Exam	70%
Course Project	10%
Course Work & Quizzes	5%
Practical Exam	10%
Total	100

Course Work & Quizzes: (Short Exams, Assignments, Researches, Reports, Presentations, Class/Project discussion)

7 -List of references

7.1 Text Books

-Data Structures and Algorithms Using C#, By Michael McMillan, Cambridge University Press, 2007.

7.2 Internet Location :

- http://www.owl.net.rice.edu/~comp320/2005/notes/tut03-data_structures/
- <http://docs.linux.cz/programming/algorithms/Algorithms-Morris/>

8- Required Facilities

8.1 Tools/Software

- .NET framework

9- Course Matrices

9.1 Course Contents/ILOs Matrix

Course Contents	a1	a2	b1	b2	b3	c1	c2	c3	d1	d2	d3
Introduction to Data Structures	√	√		√			√				
Recursion	√	√		√			√				
Arrays, Pointers, and Structures	√	√		√			√				
Linked lists	√	√	√	√	√	√	√				
Stacks	√	√	√	√	√	√	√				
Queues.	√	√	√	√	√	√	√				
Trees	√	√	√	√	√	√	√				
Graphs.	√	√	√	√	√	√	√				
Course project		√	√	√	√	√	√	√	√	√	√

9.2 Learning Methods /ILOs Matrix

Learning Methods	a1	a2	b1	b2	b3	c1	c2	c3	d1	d2	d3
Lectures	√	√	√	√	√	√	√	√			
Tutorial Exercises			√	√	√	√	√	√			
Practical Lab			√	√	√	√	√	√			
Discussions.			√	√	√	√	√	√	√	√	√

9.3 Assessment Methods /ILOs Matrix

Assessment Methods	a1	a2	b1	b2	b3	c1	c2	c3	d1	d2	d3
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