



Shoubra Faculty of
Engineering

Model No.12

Course Specifications : Data Structures

University : Benha university

Faculty : Shoubra Faculty of Engineering

Department : Electrical Engineering Department

1- Course Data

Course Title: Data Structures **Code:** ELC 315 C

Lecture: 3 **Tutorial:** 2 **Total:**5

Program on which the course is given: B.Sc. Electrical Engineering (computer engineering)

Major or minor element of program: Major.

Department offering the program: Electrical Engineering Department

Department offering the course: Electrical Engineering Department

Academic year / level: **third** Year / **first**Semester

Date of specifications approval: 10/5/2006

2- Overall aims of course:

For students undertaking this course, the aims are to:

2.1- Demonstrate how to deal with basic data structures.

2.2- Enable students to build efficient algorithms to deal with different data structures.

2.3- Describe how to compare between algorithms and find the better algorithm for a given problem.

3- Intended Learning Outcomes of Course (ILOS)

a- Knowledge and Understanding

On completing this course, students will be able to:

a- 1 – Identify the principles of design different data structures. (a-4)

a- 2- Understand the different Methodologies of solving problems using algorithms and data collection interpretation. (a-5)

b- Intellectual Skills

At the end of this course, the students will be able to:

b- 1 – Understand the required mathematical and computer-based methods for modeling and analyzing stack and lists problems. (b-1)

b- 2- Provide a creative thinking in the field of designing different trees and graphs. (b-3)

b- 3 - Apply suitable IT tools for sorting and searching problems. (b-14)

c- Professional Skills

On completing this course, the students are expected to be able to:

c- 1- Design and carry out the required data structure (hash tables, trees and graph) to solve the programming problem. (c-3)

c- 2 - Write high level computer programs with the minimum time complexity. (c-15)

d- General Skills

At the end of this course, the students will be able to:

d- 1 – Work effectively in a team work. (d-3)

d- 2 –Finish the required task within time and with the available resources. (d-6)

4- Course Contents

N o.	Topics	No. of hours
1	Programming with C++ and algorithm analysis	5
2	Lists, Stack and Queue	15
3	Sorting algorithms	15
4	Recursion	5
5	Hash tables	5
6	Trees and graphs	10
7	Heaps	10
8	Project submission	5

5- Teaching and Learning Methods

5.1- Lectures

5.2- Modified lectures

5.3- Practical training / laborat

5.4- Seminar / workshop

5.5- Class activity

5.6- Case study

5.7- Assignments / homework

6- Teaching and Learning Methods of Disables

6.1- None

7- Student Assessment

a- Student Assessment Methods

1	Assignments to assess knowledge and intellectual skills.
2	Quiz to assess knowledge, intellectual and professional skills.
3	Mid-term exam to assess knowledge, intellectual, professional and general skills.
4	Oral exam to assess knowledge and intellectual skills
5	Final exam to assess knowledge, intellectual, professional and general skills.

b- Assessment Schedule

No.	Assessment	Week
1	Interaction(Quizzes)	3,6,9
2	Oral exam	12
3	Performance-projects	10
4	Midterm Exam	7

5	Final Exam	14
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c- Weighting of Assessments

Assessment	Weight
Mid_Term Examination	20 %
Final_Term Examination	60 %
Oral Examination	0 %
Practical Examination	10 %
Semester work	5 %
Other types of assessment	5 %
Total	100 %

a- Course Notes

1- Course notes prepared by
instruct

b- Books

1- Nell Dale, Daniel T. Joyce & Chip Weems, Object-oriented data structures using Java, 2011.

- Course Coordinator : Dr/ May Ahmed Salama Mohamed

- Head of Department : prof. Sayed A. Ward



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Matrix of Knowledge and Skills of the course

Course Title: Data Structures **Code:** ELC 315 C

Lecture: 3 **Tutorial:**2**Practical:- Total:** 5

Program on which the course is given:B.Sc. Electrical Engineering (computer engineering)

Major or minor element of program: major

N o.	Topics	week	Basic Knowled ge	Intellectual Skills	Professiona I Skills	General Skills
1	Programming with C++ and algorithm analysis	1	A1,A2	b1	C1	D2
2	Lists, Stack and Queue	2	A1,A2	B1,B2	C1,C2	D1,D2
3	Lists, Stack and Queue	3	A1,A2	B1,B2	C1,C2	D1,D2
4	Lists, Stack and Queue	4	A1,A2	B1,B2	C1,C2	D1,D2

5	Sorting algorithms	5	a1, a5	B1,B2,B3	C1,C2	D1,D2
6	Sorting algorithms	6	a1, a5	B1,B2,B3	C1,C2	D1,D2
7	Recursion	7	A1,A2	B1,B2,B3	C1,C2	D1,D2
8	Midterm Exam	8				
9	Hash tables	9	A1,A2	B1,B2,B3	C1,C2	D1,D2
10	Trees and graphs	10	A1,A2	B1,B2,B3	C1,C2	D1,D2
11	Trees and graphs	11	A1,A2	B1,B2,B3	C1,C2	D1,D2
12	Heaps	12	A1,A2	B1,B2,B3	C1,C2	D1,D2
13	Heaps	13	A1,A2	B1,B2,B3	C1,C2	D1,D2
14	Project submission	14	A1,A2	B1,B2,B3	C1	D1
15	Final Exam	15				

Matrix of course content and ILO's

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Major or minor element of program: major

Course content	A1	A2	B1	B2	B3	C1	C2	D1	D2
Programming with Java and algorithm analysis	✓	✓	✓			✓			✓
Lists, Stack and Queue	✓	✓	✓	✓		✓	✓	✓	✓
Sorting Algorithms	✓	✓	✓	✓	✓	✓	✓	✓	✓
Recursion	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hash tables	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trees and graphs	✓	✓	✓	✓	✓	✓	✓	✓	✓
Heaps	✓	✓	✓	✓	✓	✓	✓	✓	✓
Project submission	✓	✓	✓	✓	✓	✓		✓	

Matrix of course aims and ILO's

Course Title: Data Structures **Code:** ELC 315 C

Lecture: 3 **Tutorial:**2**Practical:- Total:** 5

Program on which the course is given:B.Sc. Electrical Engineering (computer engineering)

Major or minor element of program: major

Department offering the program: Electrical Engineering Department

Department offering the course: Electrical Engineering Department

Academic year / level: 2013-2014 first semester

Date of specifications approval:20/6/2010

Course aims	A1	A2	B1	B2	B3	C1	C2	D1	D2
Demonstrate how to deal with basic data structures.	✓	✓	✓		✓				
Demonstrate how to build efficient algorithms to deal with different data structures	✓	✓	✓	✓	✓	✓	✓	✓	✓
Describe how to compare between algorithms and find the better algorithm for a given problem			✓	✓	✓	✓	✓		

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