Menoufiya University
Faculty of Computers and Information
Department of Computer Science

جامعة المنوفية
كلية الحاسبات والمعلومات
قسم علوم الحاسب

COURSE SPECIFICATIONS

(DATA STRUCTURE)

Programme(s) on which the course is given	CS, IT, IS and OR
Major or Minor element of programs	Major
Department offering the program	Computer Science
Department offering the course	Computer Science
Academic year / Level	2nd Year / 1st Semester

A- Basic Information

Title	Data Structure		Code	CS241
Credit Hours	**Lecture** 3	**Tutorial** 3	**Practical**	-
	Total			6

B- Professional Information

1- Overall aims of course

- Understand the concepts of data representation
- Design different algorithms for data structure
- Understand arrays, stacks and queues
- Understand linked lists and trees.

2- Intended learning outcomes of course (ILOs)

2a- Knowledge and understanding

a2 Understand and apply a wide range of principles and tools available to the software engineer, such as design methodologies, choice of algorithm, language, software libraries and user interface technique.

2b- Intellectual skills

b1 Solve a wide range of problems related to the analysis, design and construction of computer systems

b2 Analyze the requirements of a range of computer-based systems and examine the design alternatives based on the constraints imposed by society, organizations, and technology.

b6 Be creative in the solution of problems and in the development of

designs.

2c- Professional and practical skills

c5 Design, write and debug computer programs in appropriate languages.

2d- General and transferable skills

d1 Display an integrated approach to the deployment of communication skills.

d2 Use IT skills and display mature computer literacy.

d3 Work effectively with and for others.

d9 Choose and formulate suitable strategies to accomplish well-defined goals.

3- Contents

Topic	No. of Hours	Lecture	Tutorial /Practical
1 Introduction and Overview	6	3	3
2 Arrays, Record and Pointers • Linear Arrays • Control Structures. • Sub-algorithms. • Linear Arrays in Memory.	6	3	3
3 Basic Operations Done on Linear Arrays • Traversing Linear Arrays. • Inserting and Deleting. • Sorting • Linear Search • Binary Search	12	6	6
4 Multidimensional Arrays • Two Dimensional (2D) Arrays. • Representation 2D Arrays in Memory. • Pointer Arrays. • Record Structures. • Parallel Arrays.	6	3	3
5 Stacks and Queues • Stacks. • Array Representation of Stacks. • The Stack Abstract Data Type. • Queues and Priority Queues. • Array Representation of Priority Queues. • The Queue Abstract Data Type. • Multiple Stacks and Queues	12	6	6
6 Linked Lists • Introduction • Linked Lists in Memory • Basic Operations on Linked Lists • Traversing A Linked List	6	3	3
7 Linked Lists Operation • Introduction	12	6	6

• Searching A Linked List • Memory Allocation • Insertion into A Linked Lists • Deletion from A Linked Lists • Header Linked Lists			
8 A Linked Lists Abstract Data Types • Introduction. • Pointers. • Singly Linked Lists. • Case Studies. • Doubly Linked Lists	6	3	3
9 Mathematical Functions and Trees • Introduction • Performance Analysis • Complexity of Algorithms • Performance Measurement • Binary Trees • Representing Binary Trees in Memory • Traversing Binary Trees • Traversal Algorithms Using Stacks • Path Lengths • General Trees	12	6	6
10 Trees Abstract Data Structure • Introduction and Terminology. • The Abstract Data Type of Binary Trees. • Binary Tree Representations. • Binary Tree Operations	6	3	3
Total sum	**84**	**42**	**42**

4- Teaching and learning methods

5.a.1 Reports, assignments, exercises, and final written exam to assess knowledge and understanding.

5.a.2 Regular oral, practical and written quizzes to assess intellectual skills.

5.a.3 Practical projects, final practical and oral exams to assess professional skills.

5.a.4 Reports, assignments, and discussions to assess general and transferable skills.

5- Student assessment methods

5-a Methods

5.a.1 Reports, assignments, exercises, and final written exam to assess knowledge and understanding.

5.a.2 Regular oral, practical and written quizzes to assess intellectual skills.

5.a.3 Practical projects, final practical and oral exams to assess professional skills.

5.a.4 Reports, assignments, and discussions to assess general and transferable skills.

5-b Assessment schedule

Assessment 1	7th week.
Assessment 2	16th week (Oral and practical)
Assessment 3	17th -18th weeks *(final written exam*

5-c Weighting of assessments

Mid-term examination	10%
Final-term examination	70%
Oral examination.	5%
Practical examination	10%
Semester work	5%
Other types of assessment	-
Total	100%

6- List of references

6-a Course notes

There are lectures notes prepared in the form of a book given by the Lecturer

6-b Essential books (text books)

[1] Robert Lafore, Data Structures and Algorithms, SAMS,2000

6-c Recommended books

Aron M. Tennen-Baum & others, Data Structure using C, Prentice Hall, 1992

6-d Periodicals, Web sites, … etc

IEEE transactions on computers software

7- Facilities required for teaching and learning

- Datashow, screen, and laptop computer.
- PC lab connected to the Internet
- Lab equipped with programming languages.

Course Coordinator:

Dr. Waiel Shawkey

Head of Department:

Prof. Dr. Nabil Abd-El-Wahid Ismail

Date: / /