**Course Specification**

**(CS 214 Data Structures)**

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| *University:* | Helwan University |
| *Faculty:* | Faculty of Computers & Information |
| *Department:* | ***Computer science*** |

**1. Course Data**

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| --- | --- |
| **Code:** | **CS 214** |
| **Course title:** | CS 214 Data Structures |
| **Level:** | 2 |
| **Specialization:** | Computer Science |
| **Credit hours:** | 3 hours |
| **Number of learning units (hours):**  | (3) theoretical (2) practical |

**2. Course Objective**

Built-in data structures. Stacks, queues, linked lists, and tree structures. Sorting algorithms, searching algorithms, and hashing. Abstract data types (ADT).

**3. Intended Learning Outcomes:**

 **A- Knowledge and Understanding:**

A7. Define the basics of Computer Systems.

A8. Apply Programming to solve Problems.

A9. Apply the Problem Solving Techniques.

A12. Demonstrate the basics of Computer Components.

A13. Apply the Data Analysis process.

 **B- Intellectual Skills**

B3. Develop Analytical Skills.

B7. Create computer algorithms to solve different problems.

B8. Gather and assess relevant information, using abstract ideas to interpret it effectively.

B15. Focus, gather information, integrate, and evaluate the data for Problem Solving.

B22. Compare methods with data.

B23. Classify different Data types.

B24. Represent Data structures.

 **C- Professional and Practical Skills**

C1. Choose the appropriate Programming Language.

**D- General and Transferable Skills**

D3. Use different Problem solving techniques.

D4. Follow Analytical Thinking.

D10. Follow Critical and Analytical Thinking.

D13. Practice Designing skills in software projects.

D14. Practice Engineering skills for software development.

**4. Course contents**

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| --- | --- | --- | --- |
| **Topic** | **No. of hours** | **Lecture** | **Tutorial/ Practical** |
| general discussion on programming principles and software engineering | 6 | 3 | 3 |
| The basic properties and analytic features of the algorithms and the speed and “O” notation, | 12 | 6 | 6 |
| Sorting and Searching Algorithms  | 6 | 3 | 3 |
| Data Structures stacks, queues, and lists | 6 | 3 | 3 |
| Array and linked List  | 6 | 3 | 3 |
| Advanced Data Structures Linked Stack Linked Queue  | 12 | 6 | 6 |
| Tree | 6 | 3 | 3 |

**Mapping contents to ILOs**

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| --- | --- |
| Topic | Intended Learning Outcomes (ILOs) |
| Knowledge and understanding | Intellectual Skills | Professional and practical skills | General and Transferable skills |
| [A First Program](http://einstein.drexel.edu/courses/CompPhys/General/C_basics/)  | A7,A8,A9 |  | C1 | D3 |
| general discussion on programming principles and software engineering | A7,A12 | B7,B8 | C1 | D3 |
| the basic properties and analytic features of the algorithms and the speed and “O” notation, | A7,A8,A9, A13 | B15,B22 |  | D4, D10 |
| Sorting and Searching Algorithms  | A9 | B3, B7 |  | D10, D13,D14 |
| Data Structuresstacks, queues, and lists | A8,A9 | B22,B23, B24 |  | D13,D14 |
| Array and linked List  | A8,A9 | B3, B7 |  | D14 |
| Advanced Data Structures Linked Stack Linked Queue  | A8,A9 | B3,B7 |  | D14 |
| Tree | A8,A9 | B3,B7 |  | D14 |

**5. Teaching and Learning Methods**

Class Lectures

 Highly lab-based courses

**6. Teaching and Learning Methods for students with limited capability**

 Using data show

 e-learning management tools

**7. Students Evaluation**

**a) Used Methods**

Lab exam

Assignments

Lab work

Programming projects

**b) Time**

Assessment 1: Test 1 Week 4

Assessment 2: Test 2 Week 7

Assessment 3: Midterm Exam Week 10

Assessment 4: Practical Exam Week 14

Assessment 5: final written exam Week 16

**c) Grades Distribution**

Mid-term Examination 20 %

Final-Year Examination 50 %

Semester Work 20 %

Practical Exam 10%

 Total 100%

 Any formative only assessments

**List of Books and References**

**a) Notes**

Course Notes

- Handouts

**b) Mandatory Books**

 **Title:** The C Programming Language, Second Edition

 **Author(s)**: [Brian W. Kernighan](http://www.cs.bell-labs.com/~bwk) and [Dennis M. Ritchie](http://www.cs.bell-labs.com/~dmr)

 **Publisher**: Prentice Hall, Inc, 2004

 **ISBN:** 0-13-110362-8

**c) Suggested Books**

**d) Other publications**

**Course Coordinator:**  Dr. Hala Abdel-Gelil

**Chairman of the Department:** Prof. dr. Iraqy Khalifa