University of Badji Mokhtar Annaba
Faculty of Technology
Computer Science Department

Course Syllabus

Algorithms and Data Structures, Computing-automatic degree,

First Semester, L01

Instructor: Sabri Ghazi

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Office Hours: Sunday 10h:00
Course: Algorithms and Data Structures
Prerequisites:
Class Days/Times: **onsite**
Monday 8h:00 to 9h:30
Saturday 8h:00 to 9h:30
Term: S01, L01
Class Location: Online
Tutorials : onsite
1h:30min per week
Practical tutorials :
1h:30min per week

Course Description

Study of how Algorithms are designed and written, and how data could be modeled in form of Data Structure.

Course Goals/Student Learning Objectives

-Learn how to write Basic Algorithms, including simple instructions and also conditional and loops.
- Learn how data can be represented in the memory of the computer in form of simple types and also basic data structure such as array, Strings, and records.
-Learn how to write Algorithms in C programming language

Student Learning Outcomes (SLO)

Upon successful completion of this course, students will be able to:

- **SLO1** :Understanding of Fundamental Concepts: Students should have a solid grasp of fundamental concepts related to algorithms and data structures, including basic instructions, algorithm inputs and outputs, and basic data structure operations.
- **SLO2** :Algorithm Design: Students should be able to design algorithms to solve a variety of problems,
- **SLO3** : Data Structure Implementation: Students should be able to implement common data structures such as arrays,
- **SLO4** : Problem Solving: Students should develop problem-solving skills and be able to apply algorithms and data structures to solve real-world problems in computer science and related fields.

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Course content :

1. Chapter #01 Introduction
    1. Historical fact about algorithms and computing
    2. What is Algorithm, and its properties
2. Chapter #02 Simple Sequential Algorithms
    1. Algorithmic language
    2. Main component of an Algorithms
    3. Data type, Variables and Constant
    4. Basic operations
    5. Assignment, Input and Output Instructions
    6. Writing basic algorithm
    7. Implementing Algorithm in computer programming languages
3. Chapter #3 Conditional Instructions
    1. Conditional instruction (simple and combined)
    2. Conditional instruction with multi-choices
4. Chapter #4 Loops
    1. Loops
    2. While loop
    3. Repeat Loop
    4. For loop
    5. Nested loops
5. Chapter 5 Array and Strings
    1. Store retrieve and access data in Array
    2. 2Dimentions array (Matrix)
    3. Strings and textual data.
6. Chapter 6 Personalized Data type
    1. Enumeration
    2. Record
    3. More Data personalized types.

Course Schedule

Week	Due Date	SLO	Topics, Readings, Assignments
1	24/09/2023	SLO1	Course#01 Content, Syllabus, needed Tools
2	30/09/2023	SLO1	Course#02 Introduction, Algorithms definition, properties
3	02/10/2023	SLO1	Course#03 Basic Sequential Algorithms, Main component of an Algorithms
4	07/10/2023	SLO1	Course#04 Variables and data types
	09/10/2023	SLO2	Constants, and inputs outputs instructions
5	14/10/2023	SLO2	Course#05 Assignment between variables, and type casting
	16/10/2023	SLO4	,Mathematical and logic instructions
6	21/10/2023	SLO4	Course#06 Conditional Instructions
7	23/10/2023	SLO4	Course#06 Conditional Instructions with multi-choices
8	28/10/2023	SLO4	Course#07 Loops: While, Repeat
9	30/10/2023	SLO3	Course#08 Loops : For forward and backwards
10	04/11/2023	SLO3	Course#09 Loops: Nested Loops
11	06/11/2023	SLO3	Course#10 Simple Data Structures: Simple Arrays,
12	11/11/2023	SLO3	Course#11 Simple Data Structures : 2D arrays (Matrix)
13	13/11/2023	SLO3	Course#12 Simple Data Structures : Manipulating Strings
18	18/11/2023	SLO3	Course#13 Personalized Data type: Enumeration
20	20/11/2023	SLO3	Course#14 More Personalized Data type: Records
21	25/11/2023	SLO3	Course#15 Structuring our Algorithms using functions
22	27/11/2023	SLO3	Course#16 Different Strategies of problem solving in Algorithms

Course Policies and Requirements

Evaluation Method (example)

Assignment	Points	Weight
Final Exam	10	50%
Continuous evaluation	5	25%

Assignment	Points	Weight
Practical Tutorials	5	25%

Texts/Readings

Leiserson, C. E., Rivest, R. L., Cormen, T. H., & Stein, C. (1994). *Introduction to algorithms* (Vol. 3). Cambridge, MA, USA: MIT press.

Heineman, G. T., Pollice, G., & Selkow, S. (2016). *Algorithms in a nutshell: A practical guide*. " O'Reilly Media, Inc.".