



مركز الاعتماد
وإضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name:
Data Structures



1	Course title	Data structures
2	Course number	5401231
3	Credit hours (theory, practical)	3 hours
	Contact hours (theory, practical)	48 hours (practical: 39 hours, Theory: 6 hours, Exams: 3 hours)
4	Prerequisites/corequisites	Computer skills for scientific faculties/Advanced programming
5	Program title	Bachelor in Computer Information Systems
6	Program code	02
7	Awarding institution	The university of Jordan/ Aqaba Campus
8	Faculty	Information Technology and Systems
9	Department	Computer Information Systems
10	Level of course	Undergraduate(Bachelor, B.Sc.), junior level
11	Year of study and semester (s)	2nd year (1st semester, Second semester)
12	Final Qualification	Bachelor, B.Sc.
13	Other department (s) involved in teaching the course	Business Information Technology (BIT)
14	Language of Instruction	English
15	Date of production/revision	Sep. 16th 2017
16	Required / Elective	Required

17. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

Office numbers: 322

Office hours: Sun: 10:00 – 11:00, Mon: 11:00 – 12:00, Tue: 14:00 – 15:00, Thr: 12:00 – 13:00

Phone No.: 0450209 ext.35118

Email address: i_taharwa@ju.edu.jo

18. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed

19. Course Description:

As stated in the approved study plan.

This course aims to provide the students with an overview of database management systems architecture and environments, an understanding of basic database design and implementation techniques, and practical experience of designing and building a relational database. Also this course is to let students be able to discuss/explain the importance of data, the difference between file management systems and database management systems. In addition, it enables applying conceptual design methodologies for databases, learning about architecture and environments of database management systems (in particular the Entity-Relationship model). It also enables students to design and evaluate suitable security and integrity levels for database schemas. This course requires a practical work, which is assessed by producing individual or group small projects.

20. Course aims and outcomes:

<p>A- Aims: The main goal of this course is to provide concepts about Database Management systems (DBM), Entity-Relationship representation, Relational Database, Database anomalies, Functional object oriented design of C++ and pointers, and its practical applications including sequential (e.g., linked data structures as Stacks; Queues and Linked Lists) and non-sequential (e.g., Recursion; Binary trees; General trees, and graphs). Furthermore, the key objective of this course is to learn students to think logically.</p>
<p>B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...</p>
<p>A-Knowledge and Understanding: Students should be able to ...</p>
A1) Learn the organization and manipulation of data.
A2) Know the important principles of program design.
A3) Learn the powerful features of C++ programming language.
A4) Understand the basic concepts involved in structured problem solving.
A5) Understand the advantages of object oriented programming.
A6) Grasp the advantages of data abstraction and abstract data types.
<p>B- Intellectual skills: with the ability to ...</p>
B1) Compare and analyze algorithms as fundamental tools of program design.
B2) Apply mathematical tools to algorithm verification and analysis.
B3) Analytically recognize large projects as smaller problems of manageable size.
<p>C- Subject specific skills: with the ability to ...</p>
C1) Work on case studies to show how all the tools are used together to build a complete program.
C2) Develop methods to reduce program errors, verify used algorithms, and efficiently debug programs.
C3) Translate abstract ideas into practice.
C4) Implement and handle large projects.
<p>D- Transferable skills: with the ability to ...</p>
D1) Possess good programming style.
D2) Develop advanced structures and algorithms into complete programs.
D3) Choose the appropriate data structures for a certain project.
D4) Maintain the usefulness of the program, including software reusability and maintenance.

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Introduction to O.O.P. , Classes, Inheritance, Function overloading vs. Function overriding. Public vs. private vs. protected	1-3	Ismail AL-Taharwa	A1 - A6	Practical quiz	Reading from textbook, lecture notes, and lab practical examples
Abstract classes, Pointers and virtual functions	4	Ismail AL-Taharwa	A1-A6	Practical quiz	Reading from textbook, lecture notes, and lab practical examples
Lists	5	Ismail AL-Taharwa	A1, B1, C1-C4	Midterm exam	Reading from textbook, lecture notes, and lab practical examples
Stacks	6,7	Ismail AL-Taharwa	A1, B1, B2, C1-C4, D	Project+ final	Reading from textbook, lecture notes, and lab practical examples
Queues	8	Ismail AL-Taharwa	A1, B1, B2, C1-C4, D	Project+ final	Reading from textbook, lecture notes, and lab practical examples
Midterm exam					
Recursion <ul style="list-style-type: none"> Factorial Fibonacci Tower of Hanoi 	9-10	Ismail AL-taharwa	B2, B3, D	Practical quiz+ Final	Reading from textbook, lecture notes, and lab practical examples
Binary Trees: <ul style="list-style-type: none"> Concepts Application Traversal Solving mathematical expressions using postfix notation 	11, 12	Ismail AL-Taharwa	A1, C1-C4, D	final	Reading from textbook, lecture notes, and lab practical examples
Binary Search Tree (BST) <ul style="list-style-type: none"> Searching BST Finding minimum Finding maximum 	13, 14		A1, C1-C4, D	Final	Reading from textbook, lecture notes, and lab practical examples
Sorting and searching algorithms <ul style="list-style-type: none"> Bubble sort 	15, 16		A1, C2, C4, D	Final	Reading from textbook, lecture notes, and lab

<ul style="list-style-type: none"> • Merge sort • Sequential search • Binary search • Hash table • Hash map 					practical examples
Final Exam	16	Ismail AL-Taharwa			

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

Teaching (T) strategies: The course is delivered using different means like lectures in the lab and presentation .

Learning (L) Methods: Students attend classes in lab for 3 hours per week, they participate in discussions, do assignments and ask questions.

Assessment (A) Methods: There are several methods of evaluation as grading practical quizzes and conducting the Midterm and Final exam. In addition to the practical project

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Written exams measuring the level of course objectives attained, the exams are supposed to cover the theoretical understanding level, solving common problems and analytical thinking. Deliverables and Group-project are proposed to measure practical skills. Discipline and active participation are highly encouraged and will be measured according to the percentage of class attendance, in-class positive contributions, demonstrations, reviews, analytical thinking, or any positive attitude. Students are highly encouraged to present their innovative and extraordinary contributions that will be rewarded by bonus marks.

23. Course Policies:

A- Attendance policies:

1. Absence cases will be recorded daily
2. Late attendance less than 10 minutes is counted as half absence
3. late attendance greater than 10 minutes will be counted as whole absence
4. Students are allowed to attend the class any time they arrive with accordance to the regulations above as they wish

B- Absences from exams and handing in assignments on time:

1. absence with medical approve has to be approved by the university doctor after diagnosing the student

2. absence for death cases is allowed only for the cases among the closed circle

C- Health and safety procedures:

1. We obey to all working regulations and legalizations in the university

D- Honesty policy regarding cheating, plagiarism, misbehavior:

1. Apply the rules stated in the regulations and legalizations of the university. In addition, following regulations and elaborated description has to be considered by the students:

Academic Integrity: Academic integrity is a fundamental expectation of all students in this course. Cheating, plagiarism, and other forms of academic misconduct are not allowed in this course. Below is a list of common misconducts. Please notice that this is not a complete list. It is your responsibility to be familiar with the Student Code of Conduct, and conduct yourself according to the standards that are described in the code.

- Copy answers from another student's examination sheet, homework, quiz, lab assignment, or project assignment.
- Copy answers from solutions provided to students who took the course in previous semesters.
- Copy answers from other sources such as the Internet and other peoples discussions that you do not participate in.

E- Grading policy:

Midterm Exam 30% Quizzes and assignments 10% Paper reading and presentation 10% Final Exam 50%

Evaluation Scale:

Mark	≤ 34	≤ 49	≤ 54	≤ 59	≤ 64	≤ 69	≤ 74	≤ 79	≤ 84	≤ 89	≤ 94	≤ 100
Scale	F	-D	D	+D	-C	C	+C	-B	B	+B	-A	A

F- Grading policy:

- Midterm exam 30%
- Final Exam 40%
- Activities 30%
 - Deliverables 20%
 - Project 10%

G- Available university services that support achievement in the course:

1. Computer laboratories
2. Internet service
3. The library
4. Software and tools (IDEs)

VERY IMPORTANT RULES AND REGULATIONS:

- Attendance and participation are mandatory, absence may result in receiving an **ABSENT FAIL** grade or an equivalent fail grade
- It preferable to have structured participation and **avoid random additions or interruptions**
- When advised stick to the provided template for the deliverables, it would give more value to your piece of work
- Any out of order behavior, as side talks or sleeping, during the lecture time will be reported and may result in

an expel of the class room.

- Disrespect toward colleagues while talking or discussing an issue is prohibited and **will result in an expel and a penalty**.
- Late homework and assignments delivery may result in having ZERO grade for that particular deliverable
- Cheating has no excuse at all, with no exceptions, it will result in **having a penalty. Refer to the JU's regulations and legalizations regarding tests and exams.**
- Disturbing the running of the exam for any reason (e.g., technical) by any behavior **is prohibited**, it will result in having **penalty. Refer to the JU's regulations and legalizations regarding tests and exams.** In case the Instructor, lab supervisor or exam supervisor requested you to look in your monitor, to show your ID, or any other command. **Response to his order clammily and immediately. Definitely, it is your right to discuss such case after the exam.**
- **Plagiarism is unethical** activity that may result in having a **penalty**, refer to www.plagiarism.org
- Any feedback is welcomed while presented in a reasonable manner. However, **Disturbing the running of the class by making arguments** with classmates, lab supervisor, or instructor, or by any other behavior is **prohibited and will result in an expel and a penalty**. Nevertheless, any kind of **polite discussion and negotiation** regarding any issues related to the progress of the course is **welcomed at the instructor office**.

Carefully read the most recent copy of the **regulations statement** provided by the University of Jordan, as it applies to this course.

24. Required equipment:

1. Lab PC for each student enrolled in the course
2. Data show
3. White board
4. Any integrated development environment (IDE) of interest for developing C++ projects (e.g., Microsoft Visual Studio/ Code::Blocks)

25. References:

A- Required book (s), assigned reading and audio-visuels:

- Data structure using C++, Second Edition, D. S. Malik, 2010

B- Recommended books, materials, and media:

- Data structures and Algorithms in C++, by Adam Drozdek, Second Edition, 2001
- Data Structures and Algorithms analysis in C++, Fourth Edition, M.A. Weiss, 2014
- Data Structures and Algorithms in C++, John Wiley and Sons, Michael T. Goodrich, Roberto Tamassia, David M. Mount, 2011.

26. Additional information:

Moodle:
<http://elearning.ju.edu.jo/>
User Name and Password are similar to the student's Internet account at the university

Regulations:

- Every student is expected to completely adhere to the assignments and project strict deadlines, absolutely no exceptions will be given.
- University Regulations should be respected. <http://www.ju.edu.jo/rules/index.htm>

Name of Course Coordinator: Ismail AL-taharwa Signature: ----- Date Sep. 16th 2017-----

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- -Signature: -----

Copy to:
Head of Department
Assistant Dean for Quality Assurance
Course File