مركز الاعتماد وضمان الجودة

Course Syllabus

1	**Course title**	Data Structures-1
2	**Course number**	1901233
3	**Credit hours**	3 (theory, practical)
	Contact hours (theory, practical)	3 (theory, practical)
4	**Prerequisites/corequisites**	Computer Skills for Scientific Faculties (1931102)
5	**Program title**	B.Sc. in Computer Science
6	**Program code**	01
7	**Awarding institution**	The University of Jordan
8	**School**	King Abdullah II School of Information Technology
9	**Department**	Computer Science
10	**Course level**	Second Year
11	**Year of study and semester (s)**	2022, Fall
١٢	**Other department (s) involved in teaching the course**	/
١٣	**Main teaching language**	English
١٤	**Delivery method**	Blended
١٥	**Online platforms(s)**	Moodle and Microsoft Teams
١٦	**Issuing/Revision Date**	Oct, 2022

١٧ Course Coordinator:

Name: **Dr. Bilal Abu Salih** Contact hours: Sundays and Tuesday (12:30 – 13:30)

Office number: 325 Phone number: 5355000

Email: b.abusalih@ju.edu.jo

١٨ Other instructors:

Name: **Dr. Heba Saadeh** Contact hours: Sundays and Tuesday (12:30 – 13:30)

Office number: 327 Phone number: 5355000-22573

Email: heba.saadeh@ju.edu.jo

Name: Mrs. Ansar Khouri Contact hours: Sundays and Tuesday (12:30 – 13:30)

Office number: Phone number: 5355000

Email: ansar@ju.edu.jo

Name: Mrs. Lubna Nasir Eddeen Contact hours: Sundays and Tuesday (9:30 – 10:30)

Office number: Phone number: 5355000

Email: Lubna@ju.edu.jo

١٩ Course Description:

Records. Classes and data abstraction. Inheritance and composition. Templates. Contiguous list. Stacks, Stack operations and Implementation of Stacks as arrays. Queues, Queue operations and Implementation of Queues as arrays.

A- Aims:

The main goal of this course is to provide concepts about object oriented design of C++, and its practical application in different contiguous data structures.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to …

A Knowledge and understanding: Students should

A1) Understand basic concepts of object oriented programming; structures, classes.

A2) Understand the concepts of inheritance and composition.

A3) Know about templates and overloading

A4) Understand the usage and implement basic List contiguous data structure.

A5) Understand the usage and implement basic Stack contiguous data structure.

A6) Understand the usage and implement basic Queue contiguous data structure.

A7) Understand the implementation and usage of contiguous stack and its STL version.

A8) Understand implementation and usage of contiguous queue and its STL version.

A9) Understand the basic concept of complexity and how to use built-in binary search and sort

A10) Understand the concept of pointers and its usage

A11) Understand the implementation and usage of some of the STL data structures, like: Vectors, Pairs, Maps, priority queue and sets.

A12) Understand the concept of recursion and its usage.

B Intellectual skills: with the ability to

B1) Comparison between object oriented and structural programming.

B2) Build a complete model for a data structure using the contiguous implementation.

B3) Contrast the structure and function of different data structures discussed in Class

C Subject specific skills: with ability to

C1) Build and write a complete C++ program with proper use of classes, objects and data structures.

C2) Solve a real life scenarios by writing a complete C++ program with all the features required

D Transferable skills: with ability to

D1) Work in a group in order to implement specific subject using C++ programming language, object oriented techniques and data structures, and be able to present the final work and make a demo.

٢٠ Course aims and outcomes:

٢١. Topic Outline and Schedule (for Sun. Tue. and Thur. lectures):

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	C++ Review	A1, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapters 1-8
	1.2	C++ Review		Blended	In the lab / MS. Teams	Synchronous		
	1.3	**Records**		Blended		**Asynchronous**	exercises	Video, Slides, Book Ch 9
2	2.1	Records example	A1, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 9
	2.2	Records example		Blended	In the lab / MS. Teams	Synchronous		
	2.3	**Classes and data abstraction**				**Asynchronous**	exercises	Video, Slides, Book Ch 10
3	3.1	Classes & data abstraction example	A1, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 10
	3.2	Classes & data abstraction example		Blended	In the lab / MS. Teams	Synchronous		

	3.3	**Classes and data abstraction (again)**				**Asynchronous**	exercises	Video, Slides, Book Ch 10
4	4.1	Classes & data abstraction further examples	A1, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 10
	4.2	Classes & data abstraction further examples		Blended	In the lab / MS. Teams	Synchronous		
	4.3	**Inheritance and composition**				**Asynchronous**	exercises	Video, Slides, Book Ch 11
5	5.1	Inh. & comp. example	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 11
	5.2	Inh. & comp. example		Blended	In the lab / MS. Teams	Synchronous		
	5.3	**Complete Example**				**Asynchronous**	exercises	Chapters 10, 11
6	6.1	**Complete Example**	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapters 10, 11
	6.2	**Complete Example**		Blended	In the lab / MS. Teams	Synchronous		
	6.3	**Overloading and Templates**				**Asynchronous**	exercises	Video, Slides, Book Ch 13
7	7.1	Overloading & Templates example	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 13
	7.2	Overloading & Templates example		Blended	In the lab / MS. Teams	Synchronous		
	7.3	**Cont. List**				**Asynchronous**	exercises	Video, Slides, Book Ch3: ref
8	8.1	Cont. List example	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 3: ref
	8.2	Cont. List example		Blended	In the lab / MS. Teams	Synchronous		
	8.3	**Cont. Stack**				**Asynchronous**	exercises	Video, Slides, Book Ch 17, ref 4
9	9.1	Cont. Stack example	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 17, ref 4
	9.2	Cont. Stack example		Blended	In the lab / MS. Teams	Synchronous		
	9.3	**Cont. Queue**				**Asynchronous**	exercises	Video, Slides, Book Ch 17, ref 4
10	10.1	Cont. Queue example	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 17, ref 4
	10.2	Cont. Queue example		Blended	In the lab / MS. Teams	Synchronous		
	10.3	**Complete Example**				**Asynchronous**	exercises	Ch 17, ref 3, 4
11	11.1	**Complete Example**	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Ch 17, ref 3, 4
	11.2	**Complete Example**		Blended	In the lab / MS. Teams	Synchronous		

	11.3	**Complexity, alg. Header, pointer**				**Asynchronous**	exercises	Video, Slides, Book Ch 12, 15, 18
12	12.1	Alg. Header example		Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 18
	12.2	Pointer example		Blended	In the lab / MS. Teams	Synchronous		Chapter 12
	12.3	**STL Vectors, Pairs**				**Asynchronous**	exercises	Video, Slides, Book Ch 21
13	13.1	Vectors example	A11, B2, B3, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 21
	13.2	Pairs example		Blended	In the lab / MS. Teams	Synchronous		
	13.3	**STL Maps, Sets, P.Queue**				**Asynchronous**	exercises	Video, Slides, Book Ch 21
14	14.1	Maps, Sets example	A11, B2, B3, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 21
	14.2	PQueue example		Blended	In the lab / MS. Teams	Synchronous		
	14.3	**Recursion**				**Asynchronous**	exercises	Video, Slides, Book Ch 15
15	15.1	Recursion example	A11, B2, B3, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 15
	15.2	Recursion example		Blended	In the lab / MS. Teams	Synchronous		
	15.3	exercises				**Asynchronous**	exercises	Codeforces. com
16	**Final Exam**							

21. Topic Outline and Schedule (for Mon. and Wed. Lectures):

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1 Monday	C++ Review	A1, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapters 1-8
	1.2 Wednesday	C++ Review		Blended	In the lab / MS. Teams	Synchronous		
	Thursday	**Records**		**Video, Slides, Book Ch 9**				
2	2.1 Monday	Records example	A1, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 9
	2.2 Wednesday	Records example		Blended	In the lab / MS. Teams	Synchronous		
	Thursday	**Classes and data abstraction**		**Video, Slides, Book Ch 10**				

مركز الاعتماد وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

3	3.1 Monday	Classes & data abstraction example	A1, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 10
	Wednesday	**Classes & data abstraction example**		**Answer Students questions through MS. Teams**		**Asynchronous**		
	Thursday	**Classes and data abstraction (again)**		**Video, Slides, Book Ch 10**				
4	**Monday**	**Classes & data abstraction further examples**	A1, B1, C, D	**Answer Students questions through MS. Teams**		**Asynchronous**	In class questions	Chapter 10
	4.2 Wednesday	Classes & data abstraction further examples		Blended	In the lab / MS. Teams	Synchronous		
	Thursday	**Inheritance and composition**		**Video, Slides, Book Ch 11**				
5	5.1 Monday	Inh. & comp. example	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 11
	Wednesday	**Inh. & comp. example**		**Answer Students questions through MS. Teams**		**Asynchronous**		
	Thursday	**Complete Example**		**Chapters 10, 11**				
6	**Monday**	**Complete Example**	A1-3, B1, C, D	**Answer Students questions through MS. Teams**		**Asynchronous**	In class questions	Chapters 10, 11
	6.2 Wednesday	**Complete Example**		Blended	In the lab / MS. Teams	Synchronous		
	Thursday	**Overloading and Templates**		**Video, Slides, Book Ch 13**				
7	7.1 Monday	Overloading & Templates example	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 13
	Wednesday	**Overloading & Templates example**		**Answer Students questions through MS. Teams**		**Asynchronous**		
	Thursday	**Cont. List**		**Video, Slides, Book Ch3: ref**				
8	**Monday**	**Cont. List example**	A1-3, B1, C, D	**Answer Students questions through MS. Teams**		**Asynchronous**	In class questions	Chapter 3: ref
	8.2 Wednesday	Cont. List example		Blended	In the lab / MS. Teams	Synchronous		
	Thursday	**Cont. Stack**		**Video, Slides, Book Ch 17, ref 4**				
9	9.1 Monday	Cont. Stack example	A1-3, B1, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 17, ref 4
	Wednesday	**Cont. Stack example**		**Answer Students questions through MS. Teams**		**Asynchronous**		
	Thursday	**Cont. Queue**		**Video, Slides, Book Ch 17, ref 4**				
10	**Monday**	**Cont. Queue example**	A1-3, B1, C, D	**Answer Students questions through MS. Teams**		**Asynchronous**	In class questions	Chapter 17, ref 4
	10.2 Wednesday	Cont. Queue example		Blended	In the lab / MS. Teams	Synchronous		
	Thursday	**Complete Example**		**Ch 17, ref 3, 4**				
	11.1 Monday	**Complete Example**		Blended	In the lab / MS. Teams	Synchronous	In class questions	

مركز الاعتماد وضمان الجودة

11	**Wednesday**	**Complete Example**	A1-3, B1, C, D	**Answer Students questions through MS. Teams**		**Asynchronous**		Ch 17, ref 3, 4
	Thursday	**Complexity, alg. Header, pointer**		**Video, Slides, Book Ch 12, 15, 18**				
12	**Monday**	**Alg. Header example**		**Answer Students questions through MS. Teams**		**Asynchronous**	In class questions	Chapter 18
	12.2 Wednesday	Pointer example		Blended	In the lab / MS. Teams	Synchronous		Chapter 12
	Thursday	**STL Vectors, Pairs**		**Video, Slides, Book Ch 21**				
13	13.1 Monday	Vectors example	A11, B2, B3, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 21
	Wednesday	**Pairs example**		**Answer Students questions through MS. Teams**		**Asynchronous**		
	Thursday	**STL Maps, Sets, P.Queue**		**Video, Slides, Book Ch 21**				
14	14.1 Monday	Maps, Sets example	A11, B2, B3, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 21
	14.2 Wednesday	PQueue example		Blended	In the lab / MS. Teams	Synchronous		
	Thursday	**Recursion**		**Video, Slides, Book Ch 15**				
15	15.1 Monday	Recursion example	A11, B2, B3, C, D	Blended	In the lab / MS. Teams	Synchronous	In class questions	Chapter 15
	15.2 Wednesday	Recursion example		Blended	In the lab / MS. Teams	Synchronous		
	Thursday	**exercises**		**Codeforces.com**				
16	**Final Exam**							

مركز الاعتماد وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

٢٢ Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Unified Quiz-1	20	Records, Classes, Inheritance and Composition	A1-A3, B1, C, D	Week 6	Practical exam
Midterm Exam	30	The above and Templates, overloading, List, Stack and Queue	A1-A8, B1, B2, C, D	Week 10	Practical exam
Unified Quiz-2	10	STL	A9-A11, B2, B3, C, D	Week 13	MCQs
Final Exam	40	All the material	A1-11, B, C, D	Week 16	Paper-based

٢٣ Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform…etc):

1. Personal computers in labs.
2. Data show.
3. Microsoft Visual Studio Software.

٢٤ Course Policies:

A- Attendance policies:

Maximum allowable absence 15% of number of lectures per semester.

B- Absences from exams and submitting assignments on time:

Students are expected are expected to completely adhere to the assignment's strict deadlines, absolutely no exceptions are given. It's student's responsibility to inform his instructor about his absence from any exam during period not exceeding 3 days.

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Students' cheating, plagiarism and misbehavior will be transformed to special committee.

E- Grading policy:

Midterm exam (Practical: 30 marks), Unified Quizzes (Practical: 30 marks), Final exam (paper-based: 40 marks). This scale is for guidance only, it may or may not be appropriate for this term performance and therefore, it may change…

0 - 40	F
41 – 49	D-
50 – 53	D
54 – 57	D+
58 – 61	C-
62 - 66	C
67 – 70	C+
71 – 75	B-
76 – 79	B
80 – 84	B+
85 – 89	A-
90 - 100	A

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

Equipped Computer labs.

٢٥ References:

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

C++ programming: program design including data structures, by D.S. Malik, 8th edition.

B- Recommended books, materials, and media:

C++ Plus Data Structures, 3rd Edition, by Nell Dale, Jones & Bartlett Learning.

٢٦ Additional information:

For more details on university regulations please visit http://www.ju.edu.jo/rules/index.htm

- Students with special needs to describe their needs to their instructors within the first two weeks of classes in order to secure their needs. If students with special needs fail to communicate their requirements to their instructors soon enough, their instructors may not be able to secure their requirements in a timely fashion.

Name of Course Coordinator: **Dr. Bilal Abu Salih** -Signature: ---------- Date: **09/10/2022**
Head of Curriculum Committee/Department: ---------- Signature: ----------
Head of Department: ---------- Signature: ----------
Head of Curriculum Committee/Faculty: ---------- Signature: ----------
Dean: ---------- Signature: ----------