1	Course title	Parallel and Distributed Systems
2	Course number	1901468
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	0
4	Prerequisites/corequisites	Computer Networks 1(1901361)
5	Program title	CS
6	Program code	1
7	Awarding institution	The University of Jordan
8	Faculty	IT
9	Department	CS
10	Level of course	3
11	Year of study and semester (s)	Fall 2021
12	Final Qualification	BS.C
13	Other department (s) involved in teaching the course	-
14	Language of Instruction	English
15	Date of production/revision	-
16	Required/ Elective	Required

16. Course Coordinator:

Maen Al Assaf e-mail: m_alassaf@ju.edu.jo
Office numbers, 22587   office hours 1-2 PM S,M,TH .

17. Other instructors:

N/A

18. Course Description:

Distributed system basic concepts: hardware, software, design issues; communication in distributed systems; layered protocols; synchronous vs. asynchronous communication mechanisms; client-server model vs. peer-to-peer model; Remote Method Invocation (RMI) and Remote Procedure Call (RPC); group communication; processes vs. threads; synchronization: physical vs. logical clocks, Lamport clocks, distributed mutual exclusion, election algorithms; distributed transactions; case studies.

1.
2. Course aims and outcomes:
3.

A- Aims:

To learn and Understand the basic concepts associated with distributed systems ,the inter-process communication mechanism (message-passing) the advantages of deploying distributed systems

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

A. Knowledge and Understanding (students should be able to understand):
A1) the basic concepts associated with distributed systems
A2) the inter-process communication mechanism (message-passing)
A3) the advantages of deploying distributed systems
B. Intellectual skills (students should be able to):
B1) distinguish between the distributed systems models described in class
B2) distinguish between processes and threads
B3) distinguish between different distributed synchronization algorithms
C. Subject specific skills (students should be able to):
C1) write programs that address Java RMI
C2) write programs that address inter-process synchronization
C3) write programs that address timing
D. Transferable skills (students should be able to):
D1) work in a group in order to write the specification of a designated distributed system component
D2) work in a group in order to implement the component described in D1
D3) demonstrate the component implemented in D2

20. Topic Outline and Schedule:

week	lecture	Topic	SO	ILO	Teaching Methods* /platform	Evaluation Methods	Reference
1+2		**Characterization of Distributed Systems:** • Introduction • Examples of distributed systems • Trends in distributed systems • Resource sharing • Challenges	1	A1-A3	Teams	Quiz & Exam	Mentioned Below
3+4		**System Models** • Generations of distributed systems • Physical model • Architectural model • Fundamental model		B1		Quiz & Exam	Mentioned Below
5		**Networking & Internetworking** • Types of networks • Network principles • Internet protocols		A1, A2	Teams	Quiz & Exam	Mentioned Below
6+7		**Interprocess Communication** • Introduction • The API for the Internet protocols		A1-A3 B1	Teams	Quiz & Exam	Mentioned Below

		• External data representation and marshalling				
8+9		**Remote Invocation** • Introduction • Request-reply protocols • Remote procedure call • Remote method invocation		A1-A3, B1, C1	Teams	Quiz & Exam	Mentioned Below
10+11		**Operating Systems Support** • Introduction • The operating system layer • Protection • Processes and threads • Communication and invocation		A2, B2	Teams	Quiz & Exam	Mentioned Below
12+13		**Cloud Computing** • Introduction • Characteristics • Service Models: IaaS, PaaS, and SaaS		A2, A3	Teams	Quiz & Exam	Mentioned Below
14		**IoT Applications** • What is IoT? • Need for IoT? • Applications of IoT • Future Scope		A1, A3, B1	Teams	Quiz & Exam	Mentioned Below
15		**Parallel Computing** • Cost versus Performance • What is Parallel Computing? • The Scope of Parallel Computing • Issues in Parallel Computing • Models of Parallel Computers		A1, A3, B1	Teams	Quiz & Exam	Mentioned Below

16		**Models of Parallel Computers** • A Taxonomy of Parallel Architectures • Dynamic Interconnection Networks • Static Interconnection Networks • Evaluating Static Interconnection Networks	A1–A3, B1, C1	Teams	Quiz & Exam	Mentioned Below

21. Teaching Methods and Assignments:

Teaching (T) Strategies: Class Contact is 3 Hours per week. The Course will be delivered using different means like lecture, presentations, seminars, discussion and case studies.

Learning (L) Methods: Students attend classes, ask questions and participate in discussions, do the home works, present the assignments and demo their works. A student will use the lab and select a programming language to implement the assignments. Students will access the e-learning platform for more instruction and supported learning materials.

22. Evaluation Methods and Course Requirements:

Assessment (A) Methods: There will be several assessment methods of evaluation the performance of the students such as attending and class participation, grading the homework, quizzes and assignments (20%); conducting the Midterm (30%) and the Final Exam (50%). Every student is expected to completely adhere to the assignments and project strict deadlines, absolutely no exceptions will be given.

23. Course Policies:

No makeup exams will be offered

Students are expected to adhere to assignment strict deadlines and to behave responsibly

Students' acts of cheating and/or plagiarism will be penalized according to the regulations of the University of Jordan

24. Required equipment:

Java development environment

2°. References:

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

George Coulouris, Jean Dollimore, and Tim Kindberg, Gordom Blair, Distributed Systems Concepts and Design, 5th edition, Addison-Wesley, 2011.

B- Recommended books, materials, and media:
1. A. Tanenbaum, and M. Van Steen, Distributed Systems: Principles and Paradigms, 2nd Edition Prentice-Hall 2006.
2. A. Rubini et al, Linux Device Drivers, 3rd edition, O'Reilly.
3. J. Bacon, Concurrent Systems, 3rd edition, Harlow, England: Addison-Wesley.
4. Kris Jamsa, Cloud Computing , Jones & Bartlett Learning; 2012.

2٦. Additional information:

N/A

Name of Course Coordinator: ------------------Signature: ----------------------- Date: ----------------------

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

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

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

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