



1	Course title	Parallel and Distributed Systems
2	Course number	1901468
3	Credit hours (theory, practical)	3
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 2022
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.

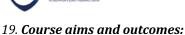
17. Other instructors:

N/A			

18. Course Description:

Parallel Systems Architectures .. 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.







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 parallel and distributed systems
- A2) the inter-process communication mechanism (message-passing)
- A3) the advantages of deploying parallel and distributed systems
- A4) Knowledge of topics related to distributed systems: cloud computing, blockchain, IoT

B. Intellectual skills (students should be able to):

- B1) distinguish between the parallel and 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) Understand Java RMI main APIs
- C2) knowledge of inter-process synchronization main APIs
- C3) knowledge of address timing main APIs

D. Transferable skills (students should be able to):

D1) make the specification of a designated distributed system component

20. Topic Outline and Schedule

week	lectur e	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	1,2	A1- A3 D1 B3	Lectur e	1. Qui z & Exa m	2. Mention ed Below
3+4		 System Models Generations of distributed systems Physical model Architectural model 	1,2	B1, B2, B3	lectur e	3. Qui z & Exa m	4. Mention ed Below





	Fundamental model					
5	Networking & Internetworking Types of networks Network principles Internet protocols	1,2	A1, A2	Lecture	5. Qui z & Exa m	6. Mention ed Below
6+7	Interprocess Communication Introduction The API for the Internet protocols External data representati on and marshalling	1,2,	A1- A3 B1	Lecture	7. Qui z & Exa m	8. Mention ed Below
8+9	Remote Invocation Introduction Request- reply protocols Remote procedure call Remote method invocation	1,2,	A1- A3, B1, C1	Lecture	9. Qui z & Exa m	10. Mention ed Below
10+1	Operating Systems Support Introduction The operating system layer Protection Processes and threads Communication and invocation	1,2, 6	A2, B2	Lectur e	11. Qui z & Exa m	12. Mention ed Below
12+1 3	 Cloud Computing Introduction Characteristics Service Models: IaaS, PaaS, and SaaS 	6	A2, A3	Lecture	13. Qui z & Exa m	14. Mention ed Below





14	IoT Applications	6		Lecture		
	 What is IoT? Need for IoT? Applications of IoT Future Scope 	O		Beetale	15. Qui z & Exa m	16. Mention ed Below
15	Parallel Computing Cost versus Performance What is Parallel Computing? The Scope of Parallel Computing Issues in Parallel Computing Models of Parallel Computers	1,2	A1, A3, B1	Lectur e	17. Qui z & Exa m	18. Mention ed Below
21.	Models of Parallel Computers	1,2	A1 - A3, B1, C1	Lecture	19. Qui z & Exa m	20. Mention ed 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 (30%); conducting the Midterm (30%) and the Final Exam (40%). 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	

25. 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.

26. Additional information:

N/A		

Name of Course Coordinator: Maen AL Assaf Signature: Maen al Assaf Date: 25 /1 /2023
Head of curriculum committee/Department: Signature:
Head of Department: Signature:
Head of curriculum committee/Faculty: Signature:
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