

Course Syllabus

1.	Course title	Distributed Systems
2.	Course number	1901466
3.	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	0
4.	Prerequisites/corequisites	Computer Networks 1(1901361)
5.	Program title	B.Sc. in Computer Science
6.	Year of study and semester (s)	Spring
7.	Final Qualification	
8.	Other department (s) involved in teaching the course	
9.	Language of Instruction	English
10.	Date of production/revision	
11.	Required/ Elective	Required

12. Course Coordinator:

*Maen Al Assaf e-mail: m_lassaf@ju.edu.jo
Office numbers, 22551 office hours 12-1 S,M,TH.*

13. Other instructors:

N/A

14. 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.

15. Course aims and outcomes:

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

16. Topic Outline and Schedule:

Topic	Week	ILOs	Program SOs ¹	TLA (teaching, learning and Assessment)
1. Characterization of Distributed Systems Introduction Examples Resource sharing Challenges	1	A1 A1-A3 A1-A3 A1		Quiz and Exam Mentioned Below
2. Networking Revision Types of networks Networking principles Internet protocols	2	A1-A2		Quiz and Exam Mentioned Below
4. Inter-process Communication External data representation and marshalling Client/server	4	A1, B1 A1-A3 A3 A1-A3 D1-D3		Quiz and Exam Mentioned Below

¹ The ABET outcomes

communication Group communication Practical section: experimenting with marshalling and unmarshalling				
5. Distributed Objects and Remote Method Invocation (RMI) Communications between distributed objects RMI and RPC Events and notifications Practical section: Java's RMI	5	A1-A3, C1 A1- A2,B1,C1 C1,D1-D3		Quiz and Exam Mentioned Below
6. Operating Systems support The OS layer Protection Processes and threads Communication and invocation	6	A2,B2		Quiz and Exam Mentioned Below
7. Timing and clocking Clocks, events, and process state Synchronizing physical clocks Logical time and logical clocks Practical section: experimenting with timing and clocks	7	B3,C2 B3,C2 B3,C2		Quiz and Exam Mentioned Below
Coordination and agreement Mutual Exclusions(ME) vs. Distributed Mutual eXclusion(DMX) RicartAgrawala's distributed mutual exclusion algorithm Maekawa's distributed mutual exclusion algorithm The tokenring election algorithm Practical section: experimenting with concurrent programming		B3,C2 B3,C2 B3,C2 B3,C2 C2- C3		Quiz and Exam Mentioned Below
9. Transactions and concurrency control Transactions Locks Timestamp ordering	8	B2,C2-C3		Quiz and Exam Mentioned Below
10. Cloud Computing Paradigm IaaS PaaS SaaS Case Study: CloudAV	9+10	A2,A3		Quiz and Exam Mentioned Below

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.

17. Evaluation Methods and Course Requirements (Optional):

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; conducting the Midterm and the Final Exams. Every student is expected to completely adhere to the assignments and project strict deadlines, absolutely no exceptions will be given.

18. 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

19. Required equipment:

Java development environmen

20. 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.

21. Additional information:

N/A

Date: -----

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

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