Princess Sumaya University for Technology
King Hussein School for Computing Sciences
Department of Computer Science

Course Syllabus – Spring Semester 2022/2023 **CS11436 Distributed Systems**	

1. Course Information

Catalog Description	This course aims to provide the concepts of distributed and parallel systems. Topics: Models of parallel systems, distributed systems characterization, design issues, and communication in distributed systems. Also, layered protocols, asynchronous transfer mode networks, client-server model, remote procedure call, remote method invocation, processes and processors, threads, system models, and fault tolerance. At the end of this course, students are expected to be able to analyze and design distributed and parallel systems.
Credit Hours	3
Prerequisite	CS 11435 Data Communications and Computer Networks
Course Type	Lecture
Required/Elective	Elective

Textbooks	• Grama, A. Gupta, G. Karypis, and V. Kumar, Introduction to Parallel Computing, 2nd Edition, Addison Wesley.
	  Introduction to Parallel Computing, Second Edition-Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar.pdf (google.com)
	• George Coulouris, Jean Dollimore, Tim Kindberg, and Gordon Blair, Distributed Systems Concepts and Design, 5th edition, Addison-Wesley.
	  https://www.academia.edu/44288222/Distributed_Systems_Concepts_and_Design

References	• Tanenbaum and M. Van Steen, Distributed Systems: Principles and Paradigms, 2nd Edition Prentice-Hall. • Kris Jamsa, Cloud Computing, Jones & Bartlett Learning.
Instructor	**Dr. Basel Mahafzah** **E-mail: b.mahafzah@psut.edu.jo**
Class Schedule	**Monday & Wednesday 11:00-12:30**
Class Location	**208**
Office Hours	**Sunday, Monday, & Tuesday, 1:00-2:00 PM**
Teaching Assistant	

2. Course Contents

Estimated Lecture Hours	Topic(s)	Chapter in Text
3	**Parallel Computing** • Cost versus Performance • What is Parallel Computing? • The Scope of Parallel Computing • Issues in Parallel Computing	Chap-1 (Parallel Book)
9	**Models of Parallel Computers** • A Taxonomy of Parallel Architectures • Dynamic Interconnection Networks • Static Interconnection Networks • Evaluating Static Interconnection Networks	Chap-2 (Parallel Book)
6	**Characterization of Distributed Systems** • Introduction • Examples of distributed systems • Trends in distributed systems • Resource sharing • Challenges	Chap-1 (Distributed Systems Book)
6	**System Models** • Generations of distributed systems • Physical model • Architectural model • Fundamental model	Chap-2 (Distributed Systems Book)
6	**Networking & Internetworking** • Types of networks • Network principles • Internet protocols	Chap-3 (Distributed Systems Book)
3	**Interprocess Communication** • Introduction • The API for the Internet protocols • External data representation and marshalling	Chap-4 (Distributed Systems Book)
3	**Remote Invocation** • Introduction • Request-reply protocols • Remote procedure call • Remote method invocation	Chap-5 (Distributed Systems Book)
3	**Operating Systems Support** • Introduction • The operating system layer • Protection • Processes and threads • Communication and invocation	Chap-7 (Distributed Systems Book)

1	**Cloud Computing** • Introduction • Characteristics • Service Models: IaaS, PaaS, and SaaS	-
1	**IoT Applications** • What is IoT? • Need for IoT? • Applications of IoT • Future Scope	-
1	**Blockchain (Optional)** • Blockchain definition • What is a distributed ledger? • Distributed Blockchain	-

3. Course Learning Outcomes @x: Mapping to CS Program Outcomes

At the end of this course, the student will be able to:

1. Define the constructs of parallel and distributed systems @1.
2. Distinguish between the parallel and distributed systems models @1.
3. Explain inter-process communication mechanisms @1.
4. Analyze and design parallel and distributed systems @2.

4. Assessment Policy

Assessment Tool	Expected Due Date	Weight
Assignments and quizzes	All course duration	20%
First Exam	25/3/2023 - 1/4/2023	20%
Second Exam	6/5/2023 - 13/5/2023	20%
Final Exam	Starting 10/6/2023	40%

5. Contribution of the Course to the Professional Component

Computer Science Topics	70%
General Education	10%
Mathematics & Basic Sciences	20%

6. Expected level of proficiency from students entering the course

Mathematics	Moderate
Physics	Not applicable
Technical writing	Not applicable
Computer programming	Low
Databases	Not applicable
System Analysis	Moderate

7. Material available to students, instructors, TAs, and department at end of the course

	Students	Department	Instructors	TA(s)
Course objectives and outcomes form	X	X	X	
Lecture notes and homework assignments/quizzes solutions	X	X	X	
Samples of homework/quizzes solutions from 3 students		X		
Samples of lab reports of 3 students				
Samples of exam solutions from 3 students		X		
Course performance forms from student surveys		X	X	
End-of-course instructor survey		X	X	

8. Academic Integrity

- **Attendance**: Excellent attendance is expected. The university policy applies if you miss classes. If you miss class, it is your responsibility to find out about any announcements or assignments you may have missed.

- **Outside sources.** Copying or adapting an assignment that is not yours (e.g., from the Internet/other students' work) is not permitted.

- **Penalties**. Penalties for plagiarism/cheating or abetting plagiarism (i.e., helping others plagiarize) can be any or all of the following:

  o Zero on the assignment/quiz where plagiarism occurred.

  o Zero on all the assignments/quizzes in the course.

  o Zero on the midterm exam.

  o Zero on the final exam.

  o A failing grade in the course.

  o A report will be written to the Deanship of King Hussein's College of Computing Sciences and the Deanship of Student Affairs.