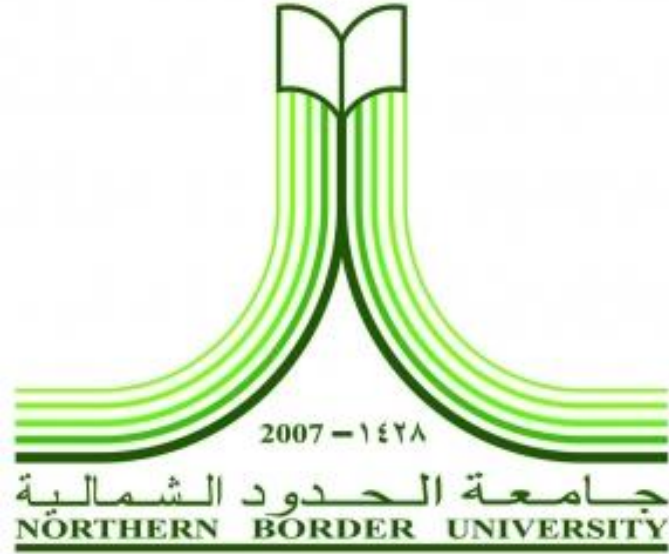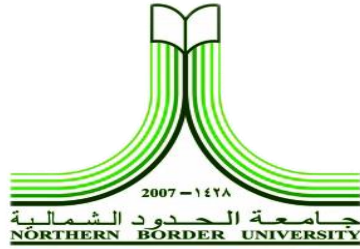المملكة العربية السعودية

جامعة الحدود الشمالية

كلية العلوم

قسم الحاسبات

نموذج بيانات المقرر

Faculty of Science

Department of Computer Science

Course Syllabus

Course Title:	Distributed Systems	**Course Code:**	**1105473**
Course Sections:	SG1, SB1, SB1-LAB	**Semester / Year:**	1st Sem.: 1442 – 1443
Instructor:	Dr. Ahmad AL-Omari	**Classroom:**	Classroom and Computer Lab
Office:	Computer Dept. Floor 2, S-320	**Website:**	-
Office Hours:	Sun 10:30 –12:00, Tue: 12:00 – 2:00 Wed: 12:00-2:00 Thu: 12:30-2:00	**E-mail:**	Ahmed.alomari@nbu.edu.sa kefia@yahoo.com
Class Days & Times:	Sun: 3:00-4:40, SB1, G118 Wed: 1:1:50 Thu: 10:00-10:50-4:30, SG1, 104 : 1:00-2:40, SB1, G118 (Lab)	**Telephone:**	-5189

COURSE DESCRIPTION:

The course cover the following topics: Introduction to distributed computing; characterstics of distributed system and challenges, Network fundamentals; Distributed computing architecture; Inter-process communications; remote invocation and middleware, operating system support naming and security considerations, distributed shared memory, Data replication, remote transaction and Distributed Database systems; client-server architecture and Web application.

COURSE OBJECTIVES:

The primary objective of the course is to familiarize students with the key issues of distributed information systems. Information systems used in industry, business and commerce will exploit distributed computing technology such as the Internet and the World Wide Web. Web-based electronic commerce, groupware, on-line transaction processing, and advanced multimedia entertainment systems are a few of the applications are now possible thanks to this technology. The course will further aim at promoting and providing students with the understanding and experience of the technologies, tools and techniques that are vital to the realization of these distributed applications.

In summary, the course has three main objectives:

- To give an understanding of relevant information technologies and software development techniques for distributed information systems;

- To critically discuss the implications of emerging technologies with regard to distributed information systems;

- To critically appraise the potential and contribution of distributed information systems to business, commerce, and industry.

A- Knowledge and Understanding: Successful completion of this course should lead to the following learning outcomes :

A- Knowledge and Understanding :
   A1) Give an understanding of relevant information technologies and software development techniques for distributed information systems;
   A2) Critically discuss the implications of emerging technologies with regard to distributed information systems;
   A3) Critically appraise the potential and contribution of distributed information systems to business, commerce, and industry.

B- Intellectual Skills :
   B1) Addressed in their design most significant characteristics of distributed system (Hetrogeneity, scalability, security, and failure handling).

B2) State all developments and challenges in implement of middleware software layer (distributed file system, remote procedure call, remote method invocation, remote events and notification, and remote transaction).

B3) State the most properties of client-server architecture and Web applications.

C- Subject Specific Skills:

C1) Learn about the operating system that support distributed system characteristics and distributed computing environments.

C2) the subject cover the well-established topics of security, data replication, group communication, distributed file system, distributed transaction, CORBA, distributed shared memory, and multimedia system.

D- Transferable Skills:

D1) Discuss all methods and techniques to assists Internet users to get their essential information in easy and transparency fashion.

D2) Discuss several methods on accessing data in distributed Systems

TOPICS TO BE COVERED:

- Introduction to Distributed Systems
- Processes
- Communication
- Naming
- Synchronization
- Consistency and Replication
- Fault Tolerance
- Distributed Object-Based Systems
- Distributed File System
- Distributed Web-Based Systems

Course Calendar

Week	Topics	Topic Details	Reference	Assessment
1	**Introduction**	Course overview, course guidelines		Quiz
	Introduction to Distributed Systems	1.1 Introduction to Distributed System 1.2 Goals (making resource accessible, transparency, openness, scalability and pitfalls) 1.3 Types of distributed systems	[1] Ch.1 [1] Ch.2	
2		2.1 Architectural Styles 2.2 System Architectures 2.3 Architectures vs. Middleware		
3	**Processes**	3.1 Threads 3.2 Virtualization 3.3 Clienst 3.4 Servers 3.4 Code Migration	[1] Ch.3	HW1
4+5	**Communication…..**	4.1 Communication Fundementals 4.2 RPC 4.3 Message Oriented Communication 4.4 Stream Oriented Communication 4.5 Multicast Oriented Communication	[1] Ch.4	Quiz
6	**Naming**	5.1 Flat Naming 5.2 Structured Naming 5.3 Attributed-based Naming	[1] Ch.5	HW2
7	**Synchronization**	6.1 Clock Synchronization 6.2 Logical Clocks 6.3 Mutual Exclusion	[1] Ch.6	Quiz
		Midterm Exam		

8	**Consistency and Replication**	7.1 Introduction (resons, replication as scaling technique) 7.2 Data-Centric consisyency models 7.3 Client-Centric consistency models	[1] Ch.7	HW3
9+10	**Fault Tolerance**	8.1 Basic concepts, failure models and masking 8.2 Process Resilience 8.3 &.4 Reliable Comm. 8.4 Group Comm. 8.5 Recovery	[1] Ch.8	Quiz
11+12	**Distributed Object-Based Systems**	10.1 Architecture: Distributed Objects 10.2 Proceeeses: object servers 10.3 Communication: Binding client to an object 10.4 Naming: CORBA Object reference 10.5 Synchronization 10.6 Consistency: Entity and replicated invocations 10.7 Fault Tolerance	[1] Ch.10	Quiz
13 +14	**Distributed File System**	11.1 Client-Server Architecture 11.2 PRC in NFS 11.3 Naming in NFS	[1] Ch.11	HW4
15	F I N A L Lab Practical E X A M			
16	F I N A L E X A M			

REQUIRED TEXTBOOK:
1. Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum and Maarten Van Steen, Pearson International Edition, 2007, ISBN: 0-13-613553-6

SUPPLEMENTARY TEXTBOOKS:
2. Distributed Systems Concepts and Design, Couloris, Dollimore, and Kindberg; 4th edition, Addison-Weley Publishing Company, 2005, IBSN: 032126345
3. Distributed Systems: Principles and Paradigms, Andrew S. Tanenbaum and Maarten van Steen, Prentice Hall, 2002.
4. Principles of Distributed Database Systems, M. Tamer Ozsu, Patrick Valduriez; 2nd Edition, Prentice Hall, 1999.
5. Distributed Computing: Principles, Algorithms, and Systems, Ajay D. Kshemkalyani, Mukesh Singhal; 1st Edition, Cambridge University Press 2008, ISBN: 13 978-0-521-87634-6
6. Computer Networks & Internets, Douglas E. Comer, Ralph E. Droms,Prentice Hall, 2nd Ed., 1999.
7. Principles of Distributed Database M. Tamer Ozsu, Patrick Valduriez: Systems, Second Edition, Prentice Hall, 1999.

COURSE ASSESSMENT:

First Exam	20 marks
Second Exam	20 marks
Participation	20 marks
Final Exam	40 marks

ATTENDANCE POLICY:
- Students are expected to be punctual and attend all classes.
- Being absent for more than 20% of allocated course time means that the student will receive a DN (denied from final exam).

Grade Distribution :

Assessment	Grade
- First Exam	20%
- Second Exam	20%
- Assignments (Reports /Quizzes/ Seminar / Tutorials ….)	20%
- Final Examination	40%

* Make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.

Last updated on 2/9/2021 by : Dr. Ahmed Al-Omari