Course Specifications

Course Title:	Distributed Systems and Parallel Processing
Course Code:	CSI 524
Program:	Computer Science and Information Technology
Department:	**Computer Science and Information**
College:	**College of Science at AL Zulfi**
Institution:	Majmaah University

Table of Contents

A. Course Identification

1. Credit hours:	

2. Course type

a. University ☐ College ☐ Department ☒ Others ☐

b. Required ☒ Elective ☐

3. Level/year at which this course is offered: 8

4. Pre-requisites for this course (if any)**:**

● CSI 321: Design and Analysis of Algorithms.

5. Co-requisites for this course (if any)**:**

NA

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	48	80 %
2	Blended	3	5%
3	E-learning	3	5 %
4	Distance learning		0 %
5	Other	6	10%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	20
3	Tutorial	10
4	Others (specify)	
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

The objective of this course is to introduce students to the fundamentals and techniques of distributed computing. Topics to be covered include: distributed computing, distributed systems, concurrency, distributed computing paradigms, inter-process communications, group communications, operating system support, distributed objects, application programming interfaces (RMI, RPC), client server model, the socket API, security issues and Internet applications. In this course also, student will study an introduction to parallel processing. Models of parallel machines. Parallel programming paradigms and models. Performance analysis of parallel systems.

2. Course Main Objective

Students will learn different techniques and procedures of Parallel and Distributed System that enable them to understand in depth knowledge. The objective of this class is to emphasize the importance and use of Parallel and Distributed System in modern world technologies.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Understand the fundamental aspects of parallel and distributed processing, taxonomies of parallel systems, and performance measures for parallel systems.	K2
1.2	Understand the theoretical limitations of parallel computing.	K2
2	Skills :	
2.1	Attempt to generate new ideas and innovations using different types of communication methods. .	S2
2.2	Able to understand and write efficient parallel application programs .	S3
3	Values:	
3.1	Apply derived knowledge using internet and other sources of library reference materials	C5

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Distributed Systems, architectural models, networking and internetworking .	8
2	Application Programming Interface: Inter process communication, RMI, Indirect communication, O.S. Support, Distributed objects and components	8
3	Distributed Sorting Algorithms: Clocks, events and process states Synchronizing physical clocks ,Logical time and logical clocks ,Global states .	8
4	Security Issues and Internet applications with case studies: Overview of security techniques, Cryptographic algorithms, Digital signatures, Cryptography pragmatics, Case study: Kerberos Traditional Web based systems, Web services, Communication, Naming, Replication of Web Applications ,Case Study : GOOGLE	12
5	Introduction to Parallel Processing: architecture, communication and performance of parallel systems	8
6	Parallel Programming Overview :Parallel Programming Paradigms-Various Methods ,Steps for creating parallel programs .	8
7	Parallel Sorting Algorithms: Partitioning, Divide and Conquer Concept, Parallel Sorting algorithms :Rank Sort ,Bubble Sort ,Odd-Even Transposition sort ,Shear Sort ,Merge Sort ,Quick Sort ,Odd-even Merge Sort .	8
Total		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Understand the fundamental aspects of parallel and distributed processing, taxonomies of parallel systems, and performance measures for parallel systems.	Lectures, Individual presentations & Brainstorming exercises	Quiz , Mid Exam , Assignment, Final Exam, Individual demonstrations.
1.2	Understand the theoretical limitations of parallel computing.		
2.0	**Skills**		
2.1	Attempt to generate new ideas and innovations using different types of communication methods.	Lectures, Individual presentations & Brainstorming exercises	Quiz , Mid Exam , Assignment, Final Exam, Individual demonstrations.
2.2	Able to understand and write efficient parallel application programs.		
3.0	**Values**		
3.1	Apply derived knowledge using internet and other sources of library reference material	Individual presentations	Individual presentations

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First written mid-term exam	6	20%
2	Second written mid-term exam	12	20%
3	Class activities, group discussions, Presentation	Every 2 weeks	5%
4	Homework + Assignments	After every Chapter	5%
5	Electronic exam	14	5%
6	Lab activities	15	5%
7	Final Exam	16	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
- Determine meeting appointments for the weak' students to solve their problems and give them academic advices.
- One office hour daily
- Dealing a workshops.
- Motivate students

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Distributed Systems: Concepts and Design (5th Edition) Hardcover by George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair,
Essential References Materials	Parallel Programming with MPI, Peter S. Pacheco, Morgan Kaufmann, 1997.
Electronic Materials	Determines as the course is going on.
Other Learning Materials	Videos and presentations are available with instructor

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom – Laboratory + Blackboard System
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show – Smart Board + Blackboard System
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Questionnaires (course evaluation) filled by the students and acquired electronically by the University	Students	Indirect Assessment
Students-faculty management meetings		
Departmental internal review of the course.	Department Council	Questionnaires

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Discussion with the industrial partners to enhance the courses in order to meet their needs.	Stockholders	Meetings
Midterms and Final Exam Project Evaluation	Course Coordinator Staff	Direct Assessment

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Dr Fayez AlFayez Dr. Theljeoui Adel	
Reference No.		
Date	25-01-2021	