

## Faculty of Computers and Information Technology

### Parallel Processing

**Information :**

**Course Code :** CS418

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Computer Science

**Instructor Information :**

Title	Name	Office hours
Lecturer	Mohamed Ahmed Hussein Ali	8
Teaching Assistant	Tasnim Salah Abdelraaouf Mahmoud Kandil	
Teaching Assistant	Salma Mohamed Shalaby Abdelaziz	

**Area Of Study :**

Evaluate effectively the merits of networking and internetworking.  
 Use all available principles and tools of remote invocation.  
 Comprehend deeply the basic concepts of resource sharing and distributed systems.  
 Show a complete understanding of inter-process communication.  
 Compare and evaluate different physical and architectural models of distributed systems.

**Description :**

Interconnection networks: parallel computing and networks, direct and indirect networks, message swDMhing layer, deadlock and live lock and starvation, routing algorithms, collective communication support. Parallel algorithms: BRAM model, basic techniques (balanced tree algorithm, divide and conquer, prefix computations, pointer jumping, partitioning), list and trees (list ranking, symmetry breaking, Euler tour techniques), searching, merging, and sorting algorithms.

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	Discuss the basic concept of modern distributed architectures.
2 -	Identify different modern paradigms of interactions in distributed systems.
3 -	Explain design aspects of distributed applications for particular distributed system architecture and the structural and functional features of distributed systems.

**b. Intellectual Skills: :**

1 -	Analyze the structural and functional differences between classic and modern distributed architectures.
2 -	Invent a distributed application that suits specific architectures.
3 -	Compare and differentiate between networking and internetworking concepts.

**c. Professional and Practical Skills: :**

1 -	Analyze, design and implement distributed processing concepts in developing programs for a distributed system.
2 -	Deploy effective supporting tools for Remote method invocation (RMI(.

3 - Create technical reports according to professional standards in inter-process communication.

**d.General and Transferable Skills :**

1 - Work in a team effectively and efficiently considering time and stress management to manipulate a distributed application via a specific methodology.

2 - Apply communication skills and techniques in presentations and report writing.

**ABET Course outcomes :**

1 - Evaluate effectively the merits of networking and internetworking.

2 - Use effectively principles and tools of remote invocation.

3 - Comprehend the basic concepts of resource sharing and distributed systems.

4 - Demonstrate understanding of inter-process communications

5 - Compare and evaluate different physical and architectural models of distributed systems

6 - Analyze and instrument an implementation of a computer program for its speed up, scale up, and parallel efficiency.

7 - Design and Implement efficient parallel algorithms and applications

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Characterization of Distributed Systems: Examples and Trends of distributed systems	4	2	2
Characterization of Distributed Systems: Resource sharing and Distributed systems Challenges	4	2	2
System models: Physical and Architectural models	4	2	2
System models: Fundamental models	4	2	2
Networking and Internetworking: Network principles	4	2	2
Networking and Internetworking: Internet protocols and Case studies	4	2	2
Interprocess Communication: API for the Internet protocols- External data representation and marshalling.	4	2	2
Interprocess Communication: Multicast communication and network virtualization	4	2	2
Mid Term Exam	2		
Remote Invocation: Request-reply protocols and remote procedure call.	4	2	2
Remote Invocation: Remote method invocation (RMI)	4	2	2
Operating System Support: Protection, Processes and threads, Communication and invocation, and file service architecture.	4	2	2
Project presentation	4	2	2
Final Exam	2		

**Teaching And Learning Methodologies :**

Interactive Lectures including Discussions

Practical Lab Sessions

Reading Materials

Online Material

Case Studies

Presentations

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	5.00	4	
Final Exam	40.00	14	
Midterm Exam	20.00	9	
Others (Participations)	5.00		
Presentations	5.00	12	
Quizzes	10.00	5	
Team Work Projects	15.00	12	

**Course Notes :**

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)