Department of ………Computer Science…….

College of ………… Science …………….

University of ………Cihan……….

Subject: Parallel Processing

Course Book – Year 3 / Second semester

Lecturer name: Dr. Kusay Faisal Abdulrazak

Academic Year: 2023/2024

Course Book

1. Course name	Parallel Processing
2. Lecturer in charge	Dr. Kusay Faisal Abdulrazak
3. Department/ College	Computer Science
4. Contact	**e-mail:** kusay.faisal@sulicihan.edu.krd **Tel:**
5. Time (in hours) per week	**Theory : 3 hr** **Practical : --**
6. Office hours	2 hr/week
7. Course code	CSC3206
8. Teacher's academic profile	Dr. Kusay Faisal was born in Sheffield, UK, 1977. Received B.SC in electrical and electronics engineering in year 2000. Received M.Sc. and Ph.D. degrees in telecommunication engineering from University Technology Malaysia (UTM) in 2007 and 2013 respectively. He did researches in Wireless communication, Radar, Satellite, LMDS, HAPS, broadband wireless access, and wireless networking fields. Currently he is a part-time lecturer in the faculty of computer science at Cihan University, Sulaimanya, taught the following subjects: · Microprocessor structure . Computer Architecture Design . Parallel Processing . Multimedia . Image processing · MATLAB Programming · Operations Research · English for computer science · Account Software Package · Accounting Information System · Computer Skills
9. Keywords	CPU design, Architecture classification, Parallel Architecture, Performance of Parallel Processing, Pipeline Processing, Interconnection Network.

10. Course overview:

The course is a comprehensive study of parallel processing techniques and their applications from basic concepts to state-of-the-art parallel computer systems. Topics to be covered in this course include the following: First, the need for parallel processing and the

limitations of uniprocessors are introduced. Next, a substantial overview and basic concepts of parallel processing and their impact on computer architecture are introduced.

11. Course objective:

This course aim is to analyze the parallelism, identify the conditions of parallelism, and study different parallel interconnection systems. It also focuses on identifying the pipeline hazards, gain in-depth knowledge of architecture and learn parallel processing and its applications to solve workloads

12. Student's obligation

The student should attend lectures and completion of all tests, attend to all practice, exams, assignments, reports , essays, …etc

13. Forms of teaching

The English language will be used in conducting the lectures. The computer and data show will be used for lectures slides presentation, whiteboard and marker will be used for father explanation.

There will be classroom discussions and the lecturer will give enough time to analyze, evaluate, and solve problems sets throughout the semester. As will as there will be practical class using emu8086 software to get more clarification about microprocessor.

14. Assessment scheme

The 100 mark will be divided as shown in the table below:

Mid-semester exam	30 %
Homework, quizzes	5 %
Classroom activities and attendance	5 %
Final theory exam	60 %

15. Student learning outcome:

At the conclusion of this course, you should be able to:
- Develop an understanding of various basic concepts associated with parallel computing environments.
- Understand the effects that issues of synchronization, latency and bandwidth have on the efficiency and effectiveness of parallel computing applications. •
- Gain experience in a number of different parallel computing paradigms including memory passing, memory sharing, data-parallel and other approaches.
- Earn experience in designing and testing parallel computing solutions to programming problems.

- View Parallel processing technique.
- Have a good idea about different interconnection network topologies.

16. Course Reading List and References:

1. M. Tokhi, M. Hossain, and M. Shaheed. "**Parallel computing for Real-Time signal processing and control**", Springer- Verlage London Ltd, 2003.
2. F. B.Moreshwer. "**Parallel Computing"**, Addison-Wesley Publishing Company, 2008.
3. M. Morris Mano, "**Computer System Architecture",** 3rd edition.
4. Hesham El-Rewini, Mostafa Abd-El-Barr. "**Advanced Computer Architecture And Parallel Processing"**, Weily, 2005.
5. David A. Patterson, Hohn L. Hinnessy. "**Computer Organization and design: the hardware / Software interface"**. 3rd edition, Elsevier, 2005.

17. The Topics:	Lecturer's name
- Introduction to Parallel Processing - Architecture Classification - Parallel Architecture - Performance of Parallel Processing - Pipeline Processing - Interconnection Network	Dr. Kusay Faisal Theory (3 hrs)

Week No.	Lecture No.	Lecture Topics	
1	2 hr	Von Neumann diagram. Parallel processing definition, goals, and applications	
	1 hr	Flynn's Classification	
2	2 hr	Flynn's Classification (continue), Shore's Classification	
	1 hr	Feng's Classification	
3	2 hr	Handler's Classification	
	1 hr	Introduction to Parallel Computers, Multithreading and Chip Multiprocessors	
4	2 hr	Multithreading and Chip Multiprocessors (continue), and Multiprocessors	
	1 hr	Synchronous Multiprocessors	
5	2 hr	Multiprocessors (Multi-core processors)	
	1 hr	Memory architectures	
6	2 hr	General examples, exercises, and review	
	1 hr		
2 hr	2 hr	Distributed Memory	
	1 hr	Hybride shared and distributed Memory	

8	2 hr	Amdahl's Law	
	1 hr	Minsky's Conjecture	
9	2 hr	Introduction to Pipeline Processing	
	1 hr	Interconnection network definition and goals	
10	2 hr	Types of Interconnection networks	
	1 hr	Network Topologies	
11	2 hr	Network Topologies (continue)	
	1 hr	Networks Evaluation	
	2 hr	General examples, exercises, and review	
12	1 hr		

18. Practical Topics (If there is any) | Lecturer's name

19. Examinations:

The type of exam the questions usually comes with problems needs to obtain the best solution to these problems, calculator required in the exam. May come one question have some definitions.

20. Extra notes:
None

21. Peer review

Reviewed and signed by:

Head of Department:
Dr. Lway Faisal Abdulrazak

Lecturer:

Dr. Kusay Faisal Abdulrazak