Identification	Subject	CMS 605 Parallel Programming, 4 KU /8 ECTS credits		
	Department	Computer Science		
	Program	Graduate		
	Term	Fall 2023		
	Instructor	PhD. Associ	ate Professor Levla	Muradkhanli
	E-mail:	leyla@khaza	r.org	
	Phone:	(+994 12) 42	21 1093	
	Classroom/	41 Mehseti s	tr. (Neftchilar camp	us). Thursday.
	hours	18:30-21:00	I III III III III III III III	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Prerequisites	Programming La	anguages, Adv	anced Data Structur	e
Language	English	001		
Compulsory/Elective	Major			
Textbooks and	Textbooks			
course materials	An Introduction to Parallel Programming," Peter Pacheco, Morgan-Kaufmann Publishers, 2011			
	Designing and E	Suilding Parall	el Programs, by Ian	Foster
	http://www.mcs.anl.gov/~itf/dbpp/text/book.html DESIGNING mt BUILDING			
				Lan Foster
Course outline	Parallel Hardware and Parallel Software. Parallel Computer Memory			
	Architectures. F Shared Memory Designing Paral	ctures. Parallel Algorithm Design. Parallel Programming Models. Memory. Distributed Memory. Hybrid Distributed-Shared Memory. ng Parallel Programs.		
Course objectives	This course is a	s an introduction to parallel programming, how to parallelize		
	programs, and h	ograms, and how to use basic tools. It covers concepts and programming		
	principles involv	inciples involved in developing scalable parallel applications.		
Learning outcomes	By the end of the course, students will be able to know :			
	• the archi	• the architecture and use of parallel computers,		
	• parallel a	parallel algorithms and parallel programming models		
	how to d	how to develop computer programs for different types of parallel		
	computers.			
reaching methods	Lecture		X	
	Group discussion		<u> </u>	
	Assignments	Assignments X		
Evoluction Contents	Course paper	ada	Doto/doo diline a	
Evaluation Criteria	Midtorm E	uas	Date/deadlines	<u>rercentage (%)</u>
	Project	l		<u> </u>
	Aggiggmanta			15
	Assignments Final Exam			15
	Total			<u>+v</u> 100%
1	IVIAI		1	100 /0

<ul> <li>parallel software performance, parallel programs design topics.</li> <li>Project Students will develop parallel programs for solving different problems to OpenMP or MPI. Students should submit research paper, program codes will give 15 minute presentation to the class, in the last week of the seme Preparation for class The structure of this course emphasizes the importance of indeper study and preparation outside of class. The lecture material concentrate on the key points raised in the text. Reading the asis chapters and becoming acquainted with them prior to class will aid understanding of the lecture. Following the lecture, you should re your notes and work on relevant problems and cases from the chap end, as well as sample exam questions. We will also have many review sessions throughout the semester. T review sessions will take place during the regular class times.</li> <li>Withdrawal (pass/fail) This course strictly adheres to the grading policy of the School of Sci and Engineering. As a result, a student is normally expected to pass a grade of at least 65%. In the event of failure, he or she will be requ to repeat the course the following term or year.</li> <li>Cheating/plagiarism Cheating or other plagiarism during the Quizzes, Midterm and I Examinations will lead to paper cancellation. In this case, the student receive a zero (0) without further consideration.</li> <li>Professional behavior guidelines During class, students must act in a way that fosters a positive acader and professional environment. Unauthorized conversations and unet behavior are forbidden.</li> <li>Ethics Students should not arrive in late to class. All cell phones must be turned off and stowed away before entering of Use of any electronic devices is not allowed in the classroom and violators will be punished accordingly.</li> </ul>	Date	Topics	Textbook/Assignments	
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Policy       • Assignments         Three assignments will be during the semester. Assignments will compare the semester.	Policy	• Assignments Three assignments will be during the semes parallel software performance, parallel program	ter. Assignments will cover ns design topics.	

Week	Date	Topics	Textbook/Assignments
1	21.09.23	Course Overview and Introduction.	Presentation
			Chapter 1
2	28.09.23	Why Parallel Computing?	Chapter 1
3	05.10.23	Parallel Hardware	Chapter 2
		SIMD systems	

		MIMD systems Interconnection networks Cache coherence	
		Shared-memory versus distributed-memory	
4	12.10.23	Parallel Software Caveats Coordinating the processes/threads Shared-memory Distributed-memory Programming hybrid systems Input and Output Performance Parallel Program Design	Chapter 2
5	19.10.23	Parallel Computer Memory Architectures Shared Memory Distributed Memory Hybrid Distributed-Shared Memory	Chapter 3
6	26.10.23	Parallel Algorithm Design	Chapter 3
7	02.11.23	Parallel Programming Models Shared Memory Model Threads Model	Chapter 4
8	09.11.23	Midterm exam	
9	16.11.23	Distributed Memory / Message Passing Model Data Parallel Model	Chapter 3
10	23.11.23	Hybrid Model SPMD and MPMP	Chapter 5
11	30.11.23	<b>Designing Parallel Programs</b> Automatic vs. Manual Parallelization Understand the Problem and the Program	Chapter 6
12	07.12.23	Designing Parallel Programs Partitioning Communications Synchronization	Chapter 6
13	14.12.23	Designing Parallel Programs Data Dependencies Load Balancing Granularity I/O	Chapter 6

		Debugging Performance Analysis and Tuning	
14	21.12.23	Parallel Examples	Lecture notes
		Array Processing PI Calculation	
15	28.12.23	Parallel Examples	Lecture notes
		Simple Heat Equation 1-D Wave Equation	
		Final exam	