



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Computer Science and Electronics

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Doctoral Programme of Computer Science

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Module name : **PARALLEL COMPUTATION**

Module level, if applicable : **DOCTORAL**

Code, if applicable : MII7271

Semester(s) in which the module is taught : 1(Odd)

Person responsible for the module : Dr. Faizal Makhrus

Lecturer(s) : Dr. Faizal Makhrus

Language : Indonesia

Relation to curriculum : Optional

Credit points : 3

Type of teaching, contact hours : Classical 1 hour, Lab 1 hour, discussion 30 minutes

Workload : 84

Requirements according to the examination regulations : 75% of attendance for attending the final exam. Final grade consists of 40% of lab works, 30% of midterm exam, and 30% of final exam

Recommended prerequisite : Operating Systems

Module objectives/ intended learning outcomes :

- CO1: Students can design and analyze parallel algorithms of common problems.
- CO2: Students can implement parallel algorithm using multiprocessor or multithreading.
- CO3: Students can implement parallel algorithm using GPU for parallel computation.
- CO4: Students can build effective and efficient parallel algorithms.

Content :

1. How to calculate time complexity
2. Architecture of parallel computer
3. How to design parallel algorithm from serial algorithm
4. Multithreading using thread in C
5. Message passing using MPI

	6. How to build an effective and efficient parallel algorithm 7. How to build parallel algorithm in GPU parallel computation
Study and examination requirements and forms of examination	: Assignment and labs, midterm examination, and final examination (written exams).
Media employed	: Presentation, interactive remote desktop
Reading List	: <ol style="list-style-type: none"> Edward Kandrot, Jason Sanders, <i>CUDA by Example: An Introduction to General-Purpose GPU Programming</i>, Addison-Wesley Professional, 2010. Peter Pacheco, <i>An Introduction to Parallel Programming</i>, Morgan-Kaufman, 2011. Russ Miller, Laurence Boxer, <i>Algorithms Sequential & Parallel: A Unified Approach 3rd Edition</i>, Cengage Learning, 2012.

The Mapping of COs to PLOs

COs	PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CO1								
CO2								
CO3								
CO4								

The PLO of DP-CS

PLO	Knowledge Area	PLO Description
PLO1	[Values and principles]	A graduate should be devoted to God Almighty, uphold the humanity values, internalize academic values and ethics, responsible in working around expertise independently.
Managerial Capability		
PLO2	[Professional attitudes]	A graduate should have good interpersonal skills; able to work together within the organization, both as a leader and a member; able to be the initiator; able to manage and delegate tasks; and have a sense of responsibility for their own work as well as take responsibility for the achievement of the organization's work.
PLO3	[Communication skills]	A graduate should be able to communicate effectively and efficiently with stakeholders from various backgrounds; use English well; and able to write and present scientific papers correctly and well.
PLO4	[Life-long learning]	A graduate should be up to date with the state-of-the-art especially in computer science field, able to take parts in the

		development of computer science field that is engaged in and relate it to other fields throughout life.
Working Capability		
PLO5	[Problem-solving and Scientific skills]	A graduate should be able to analyse science and technology problems in the computer science field, develop alternative solutions through intra disciplinary, interdisciplinary, and trans disciplinary approaches to produce innovative, original, and tested works.
PLO6	[Ability to formulate and do research]	A graduate should be able to formulate research problems through critical, exploratory, and innovative studies both independently and in groups of computer science field that is engaged in and present research results in a scientific paper at regional or international level.
Mastering Knowledge		
PLO7	[Fundamental knowledge]	A graduate should be able to develop knowledge in the field of computer science that is engaged, which includes abstraction, complexity, evolution and philosophy of changes or developments in the field of science.
PLO8	[Applied knowledge]	A graduate should be able to develop theoretical, philosophical, and applied concepts in the field of computer science that is engaged in, and to represent them in a structured and systematic manner.