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Department of Computer Science and Electronics
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Bachelor in Electronics and Instrumentation

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MODULE HANDBOOK

Module name	**High Performance Architecture and Infrastructure**
Module level	Undergraduate
Code	MII-2601
Courses (if applicable)	NA
Semester	Fall (Odd)
Contact person	Dr.techn. Ahmad Ashari, M.Kom.
Lecturer	Dr.techn. Ahmad Ashari, M.Kom.
Language	Bahasa Indonesia & English
Relation to curriculum	1. Undergraduate degree program, elective, 7th semester. 2. International undergraduate program, elective, 7th semester.
Type of teaching, contact hours	1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 30 students.
Workload	1. Lectures: 3 x 50 = 150 minutes per week. 2. Exercises and Assignments: 1 x 50 = 50 minutes per week. 3. Private study: 2 x 50 = 100 minutes per week.
Credit points	3 credit points (sks).
Requirements according to the Examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.
Recommended prerequisites	Computer Architecture and Organization, Operating System
Learning outcomes (course outcomes) and their corresponding PLOs	After completing this module, a student is expected to: CO1. Able to explain the basic concepts and architecture of high-performance computing CO2. Able to explain high-performance computing and environment CO3. Able to explain dan development of cluster, distributed, and grid CO4. Able to explain multicore, GPGPU, and quantum computing CO5. Able to explain use case of high-performance computing

PLO		CO1	CO2	CO3	CO4	CO5
Program Learning Outcome (PLO)	PLO2	√	√			
	PLO3			√	√	
	PLO4					√

Contents	1. Concept and Architecture of high-performance computing 2. High performance computing dan environment 3. Development of cluster, distributed dan Grid 4. Multicore, GPGPU, dan Quantum Computing 5. Use Case of High-performance computing
Study and examination requirements and forms of examination	The evaluation is done in 2 forms, namely: 1. Trial, either midterm or semester test, 2. Two tasks, including individual, 3. Two group assignments to be completed within a certain timeframe, and Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.
Media employed	e-learning Platform (ELOK), LCD, whiteboard, and websites.
Assessments and Evaluation	(see table below)

Type	Percentage	CO1	CO2	CO3	CO4	CO5
Tasks / Quizzes	10	√		√		
Group Task 1	15		√	√		
Midterm Test	30	√	√	√		
Group Task2	15				√	√
Final test	30			√	√	√
Total	100					

Reading List	1. High Performance Datacenter Networks: Architectures, Algorithms, & Opportunities (Synthesis Lectures on Computer Architecture), Dennis Abts and John Kim, March 2011, Morgan & Claypool Publishers 2. Multi-Core Cache Hierarchies, Rajeev Balasubramonian, Norman P. Jouppi, and Naveen Muralimanohar, 2011

	3. Performance Analysis and Tuning for General Purpose Graphics Processing Units (GPGPU), Hyesoon Kim, Richard Vuduc, Sara Baghsorkhi, Jee Choi, and Wen-mei Hwu, 2012
	4. Quantum Computing for Computer Architects, Second Edition, Tzvetan S. Metodi, Arvin I. Faruque, and Frederic T. Chong, 2011
	5. Pacheco, P., An Introduction to Parallel, Morgan Kaufmann, 2011
	6. Wilkinson, B. and Allen, M., Parallel Programming Techniques and Applications using Networked Workstations and Parallel Computers, 2nd Edition, Pearson Prentice Hall, 2005.