



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Computer Science and Electronics

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Bachelor in Computer Science

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MODULE HANDBOOK

Module name	Introduction to Blockchain																																					
Module level, if applicable	Undergraduate																																					
Code, if applicable	MII-2604																																					
Courses, if applicable	NA																																					
Semester(s) in which the module is taught	Fall (Odd)																																					
Person responsible for the module	Drs. Bambang Nurcahyo Prastowo, M.Sc																																					
Lecturer(s)	Drs. Bambang Nurcahyo Prastowo, M.Sc																																					
Language	Bahasa Indonesia & English																																					
Relation to curriculum	1. Undergraduate degree program, compulsory, 4th semester. 2. International undergraduate program, compulsory, 4th semester.																																					
Teaching methods	1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 30 students.																																					
Workload (incl. contact hours, self-study hours)	1. Lectures: 3 x 50 = 100 minutes per week. 2. Exercises and Assignments: 3 x 50 = 100 minutes per week. 3. Private study: 1 x 50 = 50 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.																																					
Required and recommended prerequisites for joining the module	NA																																					
Learning outcomes and their corresponding PLOs	<p>After completing this module, a student is expected to:</p> <p>CO1. Be able to identify and explain the Blockchain concept CO2. Be able to explain and identify Blockchain Characteristics and components CO3. Able to identify tools and approaches (algorithms) used in Blockchain CO4. Be able to explain how Blockchain works and optimization CO5. Able to present and present Blockchain Implementation in several fields</p> <table border="1" data-bbox="505 1717 1300 1900"> <thead> <tr> <th></th> <th>PLO</th> <th>CO1</th> <th>CO2</th> <th>CO3</th> <th>CO4</th> <th>CO5</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Program Learning Outcome (PLO)</td> <td>PLO1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>PLO2</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td>PLO3</td> <td></td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>PLO4</td> <td></td> <td></td> <td>√</td> <td>√</td> <td></td> </tr> </tbody> </table>							PLO	CO1	CO2	CO3	CO4	CO5	Program Learning Outcome (PLO)	PLO1						PLO2	√	√				PLO3		√	√			PLO4			√	√	
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		PLO5				√	√																																																								
Content	<ul style="list-style-type: none"> • Introduction – basic ideas behind blockchain, how it is changing the landscape of digitalization, introduction to cryptographic concepts required • Hashing, public key cryptosystems, private vs public blockchain and use cases, Hash Puzzles, Introduction to Bitcoin Blockchain • Bitcoin Blockchain and scripts, Use cases of Bitcoin Blockchain scripting language in micropayment, escrow etc Downside of Bitcoin – mining . • Alternative coins – Ethereum and Smart contracts • Alternative coins – Ethereum continued, IOTA • The real need for mining – consensus – Byzantine Generals Problem, and Consensus as a distributed coordination problem – Coming to private or permissioned blockchains – Introduction to Hyperledger • Permissioned Blockchain and use cases – Hyperledger, Corda Week 8 : Uses of Blockchain in E-Governance, Land Registration, Medical Information Systems, and others 																																																														
Study and examination requirements and examination forms	<p>The evaluation is done in 2 forms, namely:</p> <ol style="list-style-type: none"> 1. Trial, either midterm or semester test, 2. Two tasks, including individual or 3. Two group assignments to be completed within a certain timeframe, and <p>Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.</p>																																																														
Media employed	e-learning Platform (ELOK), LCD, blackboard, and websites.																																																														
Assessments and evaluation	<table border="1"> <thead> <tr> <th>Type</th> <th>Percentage</th> <th>CO1</th> <th>CO2</th> <th>CO3</th> <th>CO4</th> <th>CO5</th> </tr> </thead> <tbody> <tr> <td>Task 1</td> <td>10</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Group Task 1</td> <td>10</td> <td></td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td>MidSem Test</td> <td>30</td> <td></td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>Task 2</td> <td>5</td> <td></td> <td></td> <td></td> <td>√</td> <td></td> </tr> <tr> <td>Group Task 2</td> <td>10</td> <td></td> <td></td> <td>√</td> <td>√</td> <td></td> </tr> <tr> <td>Final Test</td> <td>30</td> <td></td> <td></td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>Total</td> <td>100</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>							Type	Percentage	CO1	CO2	CO3	CO4	CO5	Task 1	10	√					Group Task 1	10		√				MidSem Test	30		√	√			Task 2	5				√		Group Task 2	10			√	√		Final Test	30				√	√	Total	100					
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Reading list	<ol style="list-style-type: none"> 1. Bettina Warburg, Bill Wagner, Basic of Blockchain: A Guide for Building Literacy in the Economics, Technology, and Business of Blockchain, 2019 																																																														

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