



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Computer Science and Electronics

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MODULE HANDBOOK

Module name	Analysis of Algorithm and Complexity	
Module level	Undergraduate	
Code	MII-2201	
Courses (if applicable)	Analysis of Algorithm and Complexity	
Semester	Fall	
Contact person	Anny Kartika Sari, S.Si., M.Sc., Ph.D.	
Lecturer	Anny Kartika Sari, S.Si., M.Sc., Ph.D.	
Language	English	
Relation to curriculum	<ol style="list-style-type: none"> Undergraduate degree program; mandatory; 3rd, 5th, or 7th semester. International undergraduate program; mandatory; 3rd, 5th, or 7th semester. 	
Type of teaching, contact hours	<ol style="list-style-type: none"> Undergraduate degree program: lectures, < 60 students, International undergraduate program: lectures, < 30 students 	
Workload	<ol style="list-style-type: none"> Lectures: 3 x 50 = 150 minutes (2 hours 30 minutes) per week. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week. Private study: 3 x 60 = 180 minutes (3 hours) per week. 	
Credit points	3 credit points (cr).	
Requirements according to the examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.	
Recommended prerequisites	-	
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:	
	LO1 Be able to explain the concepts of algorithms and understand the central role of algorithms in computer science	PLO2
	LO2 Be able to explain the techniques to analyze and determine the complexity of algorithms, and use those techniques to solve computational problems	PLO2
	LO3 Be able to explain the basic techniques to design algorithms	PLO3
	LO4 Be able to explain and analyze several elementary data structures and determine their complexity	PLO2
	LO5 Be able to design and analyze algorithms to solve problems	PLO4
	LO6 Be able to understand theory of complexity and its relevance to analysis of algorithms	PLO2
Content	In this course, students are introduced to general theories of algorithm, techniques to analyze and decide complexity of algorithm, and also basic techniques to design algorithm that is divide and conquer followed by the analysis of the algorithm. Several efficient algorithms are also introduced, followed by their analysis and lastly the complexity theory.	
Study and examination requirements and forms of examination	Mid-terms examination and Final examination.	

Media employed	LCD, whiteboard, websites, books (as references), etc.
Assessments and Evaluation	<p>LO1: Problem 1 in mid-term exam (5%) - 5%</p> <p>LO2: Problem 2 in mid-term exam (10%), problem 3 in mid-term exam (10%), problem 1 in final exam (10%), problem 2 in final exam (10%), and assignment 1 (5%) - 45%</p> <p>LO3: Assignment 2 (5%) - 5%</p> <p>LO4: Problem 4 in mid-term exam (10%) and assignment 3 (5%) - 15%</p> <p>LO5: Assignment 4 (5%) - 5%</p> <p>LO6: Problem 3 in final exam (10%), problem 4 in final exam (10%), and assignment 5 (5%) - 25%</p>
Reading List	<ol style="list-style-type: none"> 1. W1: Cormen, et.al., Introduction to Algorithms, 3rd Edition, MIT Press/McGraw-Hill, 2009 2. A1: Dasgupta, S., et.al., Algorithms, McGraw-Hill, 2006 3. A2: Wegener, I., Complexity Theory: Exploring the Limits of Efficient Algorithms, Springer, 2005