UNDERGRADUATE PROGRAM IN COMPUTER SCIENCE
DEPARTMENT OF COMPUTER SCIENCE AND ELECTRONICS
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
UNIVERSITAS GADJAH MADA

Module name	**Discrete Mathematics**	
Module level	Undergraduate	
Code	MII-4505	
Courses (if applicable)	Discrete Mathematics	
Semester	Spring	
Contact person	Dr.-Ing. Reza Pulungan, M.Sc.	
Lecturer	Dr.-Ing. Reza Pulungan, M.Sc. Drs. Sri Mulyana, M.Kom.	
Language	Bahasa Indonesia and English	
Relation to curriculum	1. Undergraduate degree program; mandatory; 2nd, 4th, 6th, or 8th semester. 2. International undergraduate program; mandatory; 2nd, 4th, 6th, or 8th 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 (2 hours 30 minutes) per week. 2. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week. 3. Private study: 3 x 60 = 180 minutes (3 hours) 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	-	
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:	
	CO1 Students are able to explain several proving techniques, including deductive and inductive techniques, and how to apply them.	**PLO2**
	CO2 Students are able to explain concepts related to the basic structures of mathematics, including sets, sequences, sums, and relations (functions, equivalence relations, partial orders) and their applications.	**PLO1**
	CO3 Students are able to explain graph theory, properties of graphs, their categories and applications.	**PLO2**
	CO4 Students are able to explain the properties of integers and are able	**PLO2**

		to understand the applications..				
		CO5 Students are able to explain sums, recurrences, asymptotic, techniques to solve them, and their applications.			**PLO2**	
		CO6 Students are able to explain techniques, both basic and advanced, to do counting, together with its applications.			**PLO3**	
		CO7 Students are able to explain the concepts of generating functions, its relation with counting and their applications.			**PLO3**	
		CO8 Students are able to explain the fundamental concepts of algebra, including groups, rings and fields, together with their applications.			**PLO1**	

Content	Learning discrete mathematics has more than one purpose. Students are supposed to learn and understand about a set of mathematical facts and how to apply them; however, more importantly, courses should also teach students how to think logically and mathematically. To achieve these goals, we need to emphasize two aspects, namely mathematical reasoning and comprehension of various techniques for problem solving. To fulfill this, five important topics are normally collected in a single course named discrete mathematics. Those five are mathematical reasoning, combinatorial analysis, discrete structures, algorithmic reasoning, and applications and modeling. A discrete mathematics course is successful if it could find a balanced and good combination of these five topics.
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	CO	PLO	Metode Evaluasi	Tipe	Persentase	Total
	CO-1	PLO2	Problem 1 in midterm	Summative	7,5%	10%
			Exercise 1	Formative	5%	
	CO-2	PLO1	Problem 2 in midterm	Summative	7,5%	15%
			Exercise 2	Formative	5%	
	CO-3	PLO2	Problem 3 in midterm	Summative	7,5%	25%
			Exercise 3	Formative	5%	
	CO-4	PLO2	Problem 4 in midterm	Summative	7,5%	20%
			Exercise 4	Formative	5%	
	CO-5	PLO2	Problem 5 in midterm	Summative	7,5%	15%
			Exercise 5	Formative	5%	
	CO-6	PLO3	Problem 6 in midterm	Summative	7,55%	15%

			Exercise 6	Formative	5%	
	CO-7	PLO3	Problem 7 in midterm	Summative	7,55%	
			Exercise 7	Formative	5%	
	CO-8	PLO1	Problem 8 in midterm	Summative	7,55%	
			Exercise 8	Formative	5%	

Reading List	Rosen, K.H., Discrete Mathematics and its Applications, 6th Edition, McGrawHill, 2007.
	Judson, T.W., Abstract Algebra: Theory and Applications, 2015th Edition, Orthogonal Publishing L3C, 2015.
	Epp, S.S., Discrete Mathematics with Applications, 4th Edition, Brooks Cole, 2010.