# HANDBOOK

**BACHELOR OF INFORMATICS PROGRAM**
**DEPARTMENT OF INFORMATICS**
**FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS TECHNOLOGY**
**INSTITUT TEKNOLOGI SEPULUH NOPEMBER**

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| Module name | **Discrete Mathematics** |
| Module level | Undergraduate |
| Code | IF184304 |
| Courses (if applicable) | **Discrete Mathematics** |
| Semester | Fall (Gasal) |
| Contact person | Victor Hariadi, S.Si, M.Kom |
| Lecturer | Victor Hariadi, S.Si, M.Kom<br>Arya YudhiWijaya, S.Kom.,M.Kom.<br>Dr. Ahmad Saikhu, S,Si, MT. |
| Language | Bahasa Indonesia and English |
| Relation to curriculum | 1. Undergraduate degree program; mandatory; 3rd, 5th, or 7th semester.<br>2. International undergraduate program; mandatory; 3rd, 5th, or 7th semester. |
| Type of teaching, contact hours | 1. Undergraduate degree program: lectures, < 60 students,<br>2. International undergraduate program: lectures, < 40 students |
| Workload | 1. Lectures: 3 x 50 = 150 minutes (2 hours 30 minutes) per week.<br>2. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week.<br>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 80% of the lectures to sit in the exams. |
| Mandatory prerequisites | - |

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| Learning outcomes and their corresponding PLOs | After completing this module, a student is expected to: | |
| | **CO1** The students being able to understanding the Concepts and equivalence proposition logic, predicates and quantifiers concept, the use of quantifiers in the proposition, and the concept of the rule of determining conclusions. | PLO3 |
| | **CO2** Students are able to understanding The concept of proof methods such as direct evidence, proof by contraposition, proof by contradiction | PLO3 |
| | **CO3** Students are able to understanding the Definition of the set, the operation on the set, the concept of function, the concept of a relation, equivalence relation, partial ordering | PLO3 |
| | **CO4** Students are able to understanding The concept of mathematical induction, the concept of strong induction, the method of proof by strong induction and well ordering, recursive definitions, structural induction | PLO3 |
| | **CO5** Students are able to understanding the Basic counting, Pigeonhole principle, permutations and combinations, binomial coefficients and Identity, recurrent relations and its applications, solutions recurrent relations. | PLO4 |
| | **CO6** Students are able to apply Discrete Mathematics in some cases | PLO5 |
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| Content | Knowledge:<br>Mastering principles and methods to solve computation problems by using calculus, matrix, statistics, approximation, linear optimization, modelling and simulation.<br>Specific Skill:<br>Able to solve computation problems, and mathematical modelling through exact, stochastic, probabilistic, and numeric approaches effectively and efficiently. | |
| 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 | CO1: Problem 1 in mid-term exam (5%) and exercise 1 (5%) - 10%<br>CO2: Problem 2 in mid-term exam (5%) and exercise 2 (5%) - | |

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| | 10%<br>CO3: Problem 3 in mid-term exam (5%); problem 4 in mid-term exam (5%); assignment 1: make an algorithm and computer program (5%); and exercise 3 (5%) - 20%<br>CO4: Problem 5 in mid-term exam (5%); problem 1 in final exam (5%) and exercise 4 (5%) - 15%<br>CO5: Problem 2 in final exam (5%); assignment 2: make a function and recursive (5%); and exercise 5 (5%) - 15% CO6: Problem 3 in final exam (5%) and exercise 6 (5%) - 10%<br>CO7: Problem 4 in final exam (5%) and exercise 7 (5%) - 10% CO8: Problem 5 in final exam (5%) and assignment 3: make a program based on a real-life problem (5%) - 10% |
| Reading List | Kenneth H. Rosen,"Discrete Mathematics and its Applications 7th edition", McGraw HillIncorporated, New York, 2012.<br><br>Andrew Simpson, "Discrete Mathematics by Example", McGraw-Hill Incorporated, New York, 2002.<br><br>Norman L. Biggs, "Discrete Mathematics", Oxford University Press, 2002. |