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MODULE HANDBOOK

Module name	**Genetic Algorithm**
Module level	Undergraduate
Code	MII-3402
Courses (if applicable)	Introduction of Statistics
Semester	Fall (Odd)
Contact person	Aina Musdholifah, S.Kom., M.Kom., Ph.D.
Lecturer	Aina Musdholifah, S.Kom., M.Kom., Ph.D. Afiahayati, S.Kom., M.Cs., Ph.D.
Language	Bahasa Indonesia
Relation to curriculum	1. Undergraduate degree program, Elective, 5th semester. 2. International undergraduate program, Elective, 5th 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 menit) 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	-
Recommended prerequisites	-

<table>
<tr><td>Learning outcomes (course outcomes) and their corresponding PLOs</td><td>After completing this module, a student is expected to:
CO1 be able to explain the basic principles of genetic algorithms, evolutionary computing, and combinatorial optimization problems
CO2 be able to explain genetic algorithm operators and parameters
CO3 be able to formulate a fitness function to solve a particular problem
CO4 be able analyze and design problem solving using genetic algorithm and apply it to solve combinatorial problems and complex problems
CO5 be able to present the results of implementing genetic algorithms to solve a particular case project
CO6 be able to explain research trends on genetic algorithms.

<table>
<tr><th colspan="2">PLO</th><th>CO1</th><th>CO2</th><th>CO3</th><th>CO4</th><th>CO5</th><th>CO6</th></tr>
<tr><td rowspan="5">Program Learning Outcome (PLO)</td><td>PLO1</td><td></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><td></td></tr>
<tr><td>PLO3</td><td></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><td></td></tr>
<tr><td>PLO5</td><td></td><td></td><td></td><td></td><td>√</td><td>√</td></tr>
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</td></tr>
<tr><td>Contents</td><td>(a) Introduction to Genetic Algorithms, Overview of processes in algorithms, cycles of simple genetic algorithms, Holland schema theorems.
(b) Genetic Algorithm Coding, Overview of genetic algorithm operators.
(c) Selection Process.
(d) Cross Over Process.
(e) Mutation Process.
(f) Hybrid Genetic Algorithm.
(g) Applications: Scheduling, Bin Packing Problem, networking, Minimum Spanning Tree, Knapsack Problem.
(h) Project: Genetic Algorithm Implementation.
(i) Trend research on Genetic Algorithm</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>The evaluation is done in 3 forms, namely:
1. Trial, either midterm or semester test,
2. Two tasks, including individual or group assignments to be completed within a certain timeframe, and
3. Final project.

Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.</td></tr>
<tr><td>Media employed</td><td>LCD, blackboard, LMS, and websites.</td></tr>
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<tr><td>Assessments and Evaluation</td><td>
<table>
<tr><th>Type</th><th>Percentage</th><th>CO1</th><th>CO2</th><th>CO3</th><th>CO4</th><th>CO5</th><th>CO6</th></tr>
<tr><td>Individual Task</td><td>15%</td><td></td><td>√</td><td></td><td></td><td></td><td>√</td></tr>
<tr><td>Midterm Exam</td><td>35%</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>Final Project</td><td>50%</td><td></td><td></td><td></td><td>√</td><td>√</td><td></td></tr>
<tr><td>Total</td><td>100%</td><td>10</td><td>20</td><td>10</td><td>40</td><td>10</td><td>10</td></tr>
</table>
</td></tr>
<tr><td>Reading List</td><td>W1 Gen, M., Cheng, R., 2000. Genetic Algorithms and Engineering Optimization, John Wiley & Sons, Inc.,
W2 Marczyk, A., 2004, Genetic Algorithm and Evolutionary Computation,
O1 Negnevitsky, M., 2002. Artificial Intelligence: A Guide to Intelligent Systems, Addison-Wesley</td></tr>
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