



UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Computer Science and Electronics

Sekip Utara Bulaksumur Yogyakarta 55281 Telp: +62 274 546194 Email: dep-ike.mipa@ugm.ac.id Website: <http://dcse.fmipa.ugm.ac.id>

Bachelor in Computer Science

Telp : +62 274 546194

Email : prodi-s1-ikom.mipa@ugm.ac.id

Website : <http://dcse.ugm.ac.id/>

MODULE HANDBOOK

Module name	Languages and Automata
Module level	Undergraduate
Code	MII-3406
Courses (if applicable)	Artificial Intelligence
Semester	Fall (Odd)
Contact person	Retantyo Wardoyo
Lecturer	1. Drs. Retantyo Wardoyo, M. Sc.. Ph. D. 2. Dr. Suprpto, M.Ikom.
Language	Bahasa Indonesia & English
Relation to curriculum	1. Undergraduate degree program, compulsory, 3,5,7th semester. 2. International undergraduate program, compulsory, 3,5,7th semester.
Type of teaching, contact hours	1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 30 students.
Workload	1. Lectures: 2 x 60 = 120 minutes per week. 2. Exercises and Assignments: as scheduled 3. Private study: 1 x 30 = 30 minutes per week.
Credit points	3 credit points (sks).
Requirements according to the Examination regulations	-
Recommended prerequisites	Informatics Logics

<p>Learning outcomes (course outcomes) and their corresponding PLOs</p>	<p>After completing this module, a student is expected to:</p> <p>CO1. Student capable of explaining the concept of regular both expressions and languages.</p> <p>CO2. Student capable of explaining and differentiating the forms of basic finite automata: DFA, NFA, and epsilon-NFA</p> <p>CO3. Student capable of explaining the relationship between finite automata with regular expression.</p> <p>CO4. Student capable of explaining the concept of grammar and context free languages (CFL) and Finite Automata</p> <p>CO5. Student capable of explaining the basic concept of push down automata (PDA).</p> <p>CO6 Student capable of explaining the relationship between PDA and CFL.</p> <p>CO7 Student capable of applying Turing Machines to recognize accepted language</p> <table border="1" data-bbox="467 726 1472 947"> <thead> <tr> <th></th> <th>PLO</th> <th>CO1</th> <th>CO2</th> <th>CO3</th> <th>CO4</th> <th>CO5</th> <th>CO6</th> <th>CO7</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Program Learning Outcome (PLO)</td> <td>PLO1</td> <td></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> <td></td> </tr> <tr> <td>PLO3</td> <td>√</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> <td>√</td> </tr> <tr> <td>PLO5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		PLO	CO1	CO2	CO3	CO4	CO5	CO6	CO7	Program Learning Outcome (PLO)	PLO1								PLO2	√	√	√					PLO3	√	√	√	√	√	√	√	PLO4				√	√	√	√	PLO5							
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	PLO4				√	√	√	√																																											
	PLO5																																																		
<p>Contents</p>	<ol style="list-style-type: none"> 1. Introduction: (a)Principals of forming languages and automata, (b) Concept of languages, and operations on languages, (c) Regular languages and expressions 2. Deterministic and Non Deterministic Finite Automata: - Regular languages accepted by finite automata - Finite Automata accepting regular languages 3. Context-Free Grammar (CFG), and regular CFG : Finite Automata accepting languages generated by regular CFG, and vice versa 4. Pushdown Automata (PDA): (a) PDA accepting languages generated by CFG, (b) CFG generating languages accepted by PDA 5. Turing Machines: Language accepted by Turing Machine 																																																		
<p>Study and examination requirements and forms of examination</p>	<p>The evaluation is done in 3 forms, namely:</p> <ol style="list-style-type: none"> 1. Trial, either midterm or semester test, 2. Three individual assignment <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>																																																		
<p>Media employed</p>	<p>e-learning Platform (eLOK), LCD, whiteboard, and websites.</p>																																																		

Assessments and Evaluation	Type	Percentage	CO1	CO2	CO3	CO4	CO5	CO6	CO7
	Individual Task 1	15	√	√	√				
	Midterm Exam	30	√	√	√				
	Individual Task 2	20				√	√	√	√
	Final Exam	35				√	√	√	√
	Total	100							
Reading List	<ul style="list-style-type: none"> • WA: Russell, S. and Norvig, P., 2020, Artificial Intelligence: A Modern Approach, 4th Edition, Pearson, US. • WB: George F. Luger, 2008, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 6th Edition, Addison-Willy • AA: Michael Negnivitsky, 2004, Artificial Intelligence: A Guide to Expert Systems, 2nd Edition, Addison Willy • AB: W. Firebaugh, 2000, Artificial Intelligence: A Knowledge-Based Approach, Boyd & Fraser, Boston 								

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