



# UNIVERSITAS GADJAH MADA

Faculty of Mathematics and Natural Sciences

Department of Computer Science and Electronics

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## Bachelor in Electronics and Instrumentation

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## MODULE HANDBOOK

Module name	<b>Advance Electronics</b>
Module level	Undergraduate
Code	MII-2312
Courses, if applicable	Advance Electronics
Semester(s)	Summer (Even)
Person responsible for the module	Drs. Abdul Ro'uf, M.IKom
Lecturer(s)	Drs. Abdul Ro'uf, M.IKom Dr. Y. Suyanto, M.IKom
Language	Bahasa Indonesia and English
Relation to curriculum	1. Undergraduate degree program, compulsory, 4th semester. 2. International undergraduate program, compulsory, 4th semester.
Teaching methods	1. Undergraduate degree program: lectures, < 80 students, 2. International undergraduate program: lectures, < 30 students.
Workload (incl. contact hours, self-study hours)	1. Lectures: 2 x 50 = 100 minutes (1 hours 10 menit) per week. 2. Exercises and Assignments: 2 x 50 = 100 minutes per week. 3. Private study: 2 x 50 = 100 minutes per week.
Credit points	2 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.
Required and recommended prerequisites for joining the module	Students must complete the Digital Electronics (MII-1301) course.
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to: CO1 - Understand the basic concepts of sequential logic circuits, the basic circuit of memory element, latch and flip-flops and their function and characteristics. CO2 - Able to design several kinds of registers and counters using the classical digital design approach and using an HDL-based approach. CO3 - Able to analyze sequential circuits using classical analysis stages approach. CO4 - Able to synthesize sequential circuits using classical design stages approach and using an HDL-based approach.

	<table><tr><td colspan="2">PLO</td><td>CO1</td><td>CO2</td><td>CO3</td><td>CO4</td><td>CO5</td></tr><tr><td rowspan="5">Program Learning Outcome (PLO)</td><td>PLO1</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></tr><tr><td>PLO3</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></tr><tr><td>PLO5</td><td></td><td></td><td></td><td></td><td></td></tr></table>	PLO		CO1	CO2	CO3	CO4	CO5	Program Learning Outcome (PLO)	PLO1						PLO2	√	√				PLO3		√	√	√		PLO4			√	√		PLO5																							
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Content	<div>1. Basic concepts of sequential logic circuits</div> <div>2. Memory element</div> <div>3. Latch and Flip-flop</div> <div>4. Registers and Counters</div> <div>5. Hardware description language using VHDL</div> <div>6. Sequential logic circuit analysis and synthesizer</div> <div>7. Designing the sequential logic circuit using VHDL</div>																																																								
Study and examination requirements and examination forms	<div>The evaluation is done in 3 forms, namely:</div> <div>1. Exam, either midterm or semester test,</div> <div>2. Eight tasks, individual assignments to be completed within a certain timeframe, and</div> <div>3. Two quizzes, held on face-to-face, once before midterm exam and once after midterm exam, with a short answer form.</div> <div>Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.</div>																																																								
Media employed	LCD, blackboard, and websites.																																																								
Assessments and evaluation	<table><tr><th>Type</th><th>Percentage</th><th>CO1</th><th>CO2</th><th>CO3</th><th>CO4</th><th>CO5</th></tr><tr><td>Quiz</td><td>6 %</td><td>√</td><td></td><td>√</td><td></td><td></td></tr><tr><td>Individual Task</td><td>24 %</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>Group Task</td><td>0 %</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Midterm Exam</td><td>30 %</td><td>√</td><td>√</td><td></td><td></td><td></td></tr><tr><td>Final Exam</td><td>40 %</td><td></td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Total</td><td>100</td><td></td><td></td><td></td><td></td><td></td></tr></table>	Type	Percentage	CO1	CO2	CO3	CO4	CO5	Quiz	6 %	√		√			Individual Task	24 %	√	√	√	√		Group Task	0 %						Midterm Exam	30 %	√	√				Final Exam	40 %			√	√		Total	100%						Total	100					
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Reading list	<div>[1] LaMeres, B. J. (2020). <i>Introduction to Logic Circuits &amp; Logic Design with VHDL</i>. Germany: Springer International Publishing.</div> <div>[2] Floyd, T. L. (2015). <i>Digital Fundamentals</i>, Global Edition. United Kingdom: Pearson Education Limited.</div> <div>[3] Mano, M. M., Ciletti, M. D. (2013). <i>Digital Design: International Editions</i>. United Kingdom: Pearson Education Limited.</div>																																																								

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