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

Module name	**Advanced Electronics**
Module level	**Undergraduate**
Code-Class	**MII2814**
Courses requirement (if applicable)	**Digital Electronics**
Semester	**Even (Genap)**
Contact person	**Drs. Abdul Ro'uf, M.IKom**
Lecturer	**1. Drs. Abdul Ro'uf, M.IKom** **2. Dr. Ahmad Ashari, M.IKom** **3. Dr. Yohanes Suyanto, M.IKom**
Language	**Bahasa Indonesia**
Relation to curriculum	**1. Undergraduate degree program, mandatory, 4th semester.**
Type of teaching, contact hours	**Undergraduate degree program: lectures, < 60 students, 150 minutes**
Workload	**1. Lectures: 3 x 50 = 150 minutes (2.5 hours) 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	
Course learning Outcomes and their corresponding PLOs	**After completing this module, a student is expected to:** ***CO1*** **Be able to explain two types of digital circuits: combinational and sequential.** **PLO2** ***CO2*** **Be able to explain the stages in combinational and sequential circuit design.** **PLO2** ***CO3*** **Be able to simplify the circuit through mathematical methods with boole algebra, visual with karnough maps and algorithmic with Quine McCluskey tabulations.** **PLO3** ***CO4*** **can realize the circuit using NAND, NOR, XOR, Decoder and Multiplexer gates.** **PLO3** ***CO5*** **can describe the function of a sequential circuit through sequential circuit analysis stages.** **PLO4** ***CO6*** **can design sequential circuits through sequential sequences** **PLO4**

	synthesis stages.
Content	**This lecture will discuss two types of digital circuits: combinational and sequential digital. Stages in combinational circuit design. Description and manipulation of logic functions mathematically using boolean algebra. Description and simplification of functions using the Karnough map. Description of functions in N dimension space and simplification using the Quine-McCluskey tabulation method. Simplification method for multiple-output circuits. Realization of the circuit using NAND, NOR and XOR gates. Special realization for popular circuits. Various flip-flop circuits. Analysis of sequential circuits and synthesis of sequential circuits, both clock mode, level mode and pulse mode. Introduction of VHDL to combinational and sequential circuits.**
Study and examination requirements and forms of examination	**Midterms examination and Final examination.**
Media employed	**LCD, blackboard, websites, simulation tools.**
Assessments and Evaluation	**CO-1 Midterm exam, quiz (total: 10%)** **CO-2 Midterm exam, quiz (total: 10%)** **CO-3 Midterm exam, assignment (total: 20%)** **CO-4 Final exam, assignment (total: 15%)** **CO-5 Final exam, assignment (total: 15%)** **CO-6 Final exam, assignment (total: 30%)**
Reading List	**Hill, Peterson, 1993, *Introduction to Switching Theory and Logical Design*, Third-edition, John Wiley & Sons., New York. [4] Mano & Kime, 2008, *Logic and Computer Design Fundamentals*, 4th Edition, Pearson Prentice Hall.** **Wakerly, John F, 2007, *Digital Design Principles and Practices*, Fourth-edition, Pearson International Edition, Singapore.** **Astola & Stankovic, 2006, *Fundamentals of Switching Theory and Logical Design*, Springer, Netherland.** **Mano, 2004, *Digital Design*, Second Edition, Prentice- Hall Inc., New Jersey**