

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

Module name	Microcontroller	
Module level	Undergraduate	
Code	MII-1602	
Courses (if applicable)	Microcontroller	
Semester	Spring	
Contact person	Dr. Agfianto Eko Putra, M.Si.	
Lecturer	Dr. Agfianto Eko Putra, M.Si. Bakhtiar Alldino Ardi Sumbada, S.Si., M.Cs.	
Language	Bahasa Indonesia and English	
Relation to curriculum	<ol style="list-style-type: none"> Undergraduate degree program; compulsory; 4th, 6th or 8th semester. International undergraduate program; compulsory; 4th, 6th or 8th semester. 	
Type of teaching, contact hours	<ol style="list-style-type: none"> Undergraduate degree program: lectures, < 60 students, International undergraduate program: lectures, < 30 students 	
Workload	<ol style="list-style-type: none"> Lectures: 3 x 50 = 150 minutes (2 hours 30 minutes) per week. Exercises and Assignments: 3 x 60 = 180 minutes (3 hours) per week. 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	-	
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:	
	CO1 Capable to explain about the general microcontrollers and ARM Cortex M0 based microcontroller, specifically the Nuvoton NUC140 series device and gives some examples of the microcontrollerbased applications;	PLO2, PLO3
	CO2 Capable to understand the concept of libraries based microcontroller programming of Cortex Microcontroller Software Interface Standard or CMSIS	PLO2, PLO3

	in general and specifically for Nuvoton ARM Cortex M0 NUC100 series (BSP NUC100 CMSIS);	
	CO3 Capable to install the software associated compiler, such as Cocox IDE or Keil MDK and use the NUC140 Learning Board from Nuvoton;	PLO2, PLO3
	CO4 Understanding the basic concepts of Clock and handling RESET on NUC100 series microcontroller;	PLO2, PLO3
	CO5 Understand the basic concepts of GPIO and able to create applications that involve GPIO and interrupt facilities at NUC100 series microcontroller;	PLO2, PLO3
	CO6 Understand the basic concepts of serial communication and is able to create application programs that involve UART (Universal Asynchronous Receiver/Transmitter), I2C (Inter-Integrated Circuit) and SPI (Serial Peripheral Interface) on the NUC100 series microcontroller;	PLO2, PLO3
	CO7 Understand the basic concepts and is able to create application programs that involve ADC (Analog-to-Digital Converter) on the NUC100 series microcontroller;	PLO2, PLO3
	CO8 Understand the basic concepts and be able to make an application program involving facilities Timer, Watchdog Timer, RTC (RealTime Clock), PWM (Pulse Width Modulation) and Capture Timer on the NUC100 series microcontroller.	PLO2, PLO3
Content	<p>Microcontroller, as a technological breakthrough microprocessors and microcomputers, present to meet the market needs and new technology. As a new technology, the semiconductor technology containing more transistors, but only requires a small space and can be mass produced (in quantity) to make the price becomes cheaper (compared microprocessor). As the needs of the market, the microcontroller present to meet the tastes of industry and consumer needs or desires of assistive devices or devices better and sophisticated. The development and the need for microcontroller-based technology have become the main reason of Microcontroller course in Computer Science (CS) undergraduate program, Department of Computer Science and Electronics, Faculty of Mathematics and Natural Sciences, Universitas Gadjah Mada.</p>	

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	CO	Metode Evaluasi	Tipe	Persentase	Total
	CO1	Assignment 1		5.00%	
		Question 1 at mid-terms exam	Sumatif	5.00%	10%
	CO2	Assignment 1	Formatif	5.00%	10%
		Question 2 at mid-terms exam	Sumatif	5.00%	
	CO3	Assignment 2	Formatif	10.00%	15%
		Question 3 at mid-terms exam	Sumatif	5.00%	
	CO4	Assignment 2	Sumatif	5.00%	10%
		Question 4 at mid-terms exam	Sumatif	5.00%	
	CO5	Assignment 3	Formatif	5.00%	10%
		Question 1 at final exam	Sumatif	5.00%	
	CO6	Assignment 3	Formatif	5.00%	10%
		Question 2 at final exam	Sumatif	5.00%	
	CO7	Assignment 4	Formatif	5.00%	15%
		Question 3 at final exam	Sumatif	10.00%	
CO8	Assignment 4	Formatif	5.00%	15%	
	Question 4 at final exam	Sumatif	10.00%		
Reading List	<p>Putra, A.E., 2017, Handout Kuliah Mikrokontroler ARM Cortex M0 versi 2017, Lab. Sistem Komputer dan Jaringan, Departemen Ilmu Komputer dan Elektronika, Fak. MIPA, UGM, Yogyakarta.</p> <p>Nuvoton, 2013, NuMicro™ NUC100 Series NUC130/NUC140 Technical Reference Manual rev 2.05, Nuvoton Technology Corporation, Taiwan.</p> <p>Nuvoton, 2014, Nu-LB-NUC140 User Manual for NuMicro™ NUC100 Series rev 2.0, Nuvoton Technology Corporation, Taiwan</p>				