Microcontroller

Module name	Microcontroller	
Module level	Undergraduate	
Code	IF221226	
Courses (if applicable)	Microcontroller	
Semester	5/6	
Lecturer	Budi Nugroho, S.Kom, M.Kom (PIC) Dr. Basuki Rahmat, S.Si, M.T	
Language	Bahasa Indonesia and English	
Relation to curriculum	Elective; 5th or 6th semester	
Type of teaching, contact hours	Lectures, < 60 students,	
Teaching Methods	project-based learning, problem-based learning	
Workload	1. Lectures: 3 sks x 50 = 150 minutes (2 hours 30 minutes) 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 80% of the lectures to sit in the exams.	
Mandatory prerequisites	Artificial Intelligence	
Courses description	The Microcontroller Course is a subject that emphasizes the development of programming skills for a microcontroller system, covering everything from input devices, programming, to output devices. In this course, students are expected to build a microcontroller system to address related issues.	
Learning outcomes and their corresponding PLOs	After completing this module, a student is expected to:	
	CO1 Students are capable to provide a detailed explanation of each sub-component of a microcontroller system (C1, A2)	PLO9,PLO10
	CO2 Students are capable of implementing programming on a microcontroller (C3, A3)	PLO9,PLO10
	CO3 Students are capable to build a simple microcontroller system incorporating both input and output devices within a practical case study (C6, A4, P2)	PLO9,PLO10
Content	The topics relevant to this course include: concepts of current, voltage, and power in digital systems; logic gates; fundamental aspects of the Atmega microcontroller (subsections, pin layouts, and pin functions); methods for reading values from digital input pins and writing values to digital output pins; methods for reading values from analog input pins and writing values to analog inputs; concepts of frequency, millis, and delay.	
Media employed	LCD, whiteboard, websites, books (as references), online meeting, etc.	

Assessments and Evaluation	One written Midterm assessment (60 minutes) and one final oral exam (30 minutes), two short computer-based quizzes, take home written assignments
Study and examination requirements and forms of examination	The final grade in the module is composed of: • Two short computer-based quizzes: 15% x 2 = 30% • Take-home written assignments : 15% • Written Midterm assessment: 25% • Final oral exam: 30% Students must have a final grade of 55.6% or higher to pass.
Reading List	● D. Morales, Advanced Microcontroller Programming in C. London, UK: TechPress, 2024. ● P. Singh and K. Müller, Hands-On IoT with Embedded C, 2nd ed. Berlin, Germany: Springer, 2023. ● M. Chen, Arduino and Beyond: IoT Development with Microcontrollers and C, Packt, 2024. ● G. M. Iodice, TinyML Cookbook: Combine machine learning with microcontrollers to solve real-world problems, 2nd ed. Packt Publishing, 2023. ISBN: 978-1837637362. [Online]. Available: https://portal.igpublish.com/iglibrary/obj/PACKT0006951?searchid=1755044764526H35QvuTk30Ivi~CIKnGvJ ● Atul Krishna Gupta and Dr. Siva Prasad Nandyala, Deep Learning on Microcontrollers: Learn How to Develop Embedded AI Applications Using TinyML. BPB Publications, Apr. 2023. ISBN: 978-9355518057. [Online]. Available: https://portal.igpublish.com/iglibrary/obj/BPB0000426?searchid=1755044764526H35QvuTk30Ivi~CIKnGvJ