

Course Code	TKEE163222													
Course Name	Microprocessors Based Systems													
Course Instructors	Addin Suwastono, Agus Bejo													
Course Type	Selected Elective													
Course Classification	Engineering Topics													
Credit / Contact Hour per Week	2 / 100 minutes per Week													
Course Description	This course aims to give students the ability to understand the concept of microcontroller based systems, understand the constituent elements, how it works, to be able to make it independently. The learning process is done by lecturing, simulation using software, and practice directly by using evaluation board													
Prerequisites Courses	Microprocessor Systems, Digital Technique													
Covered Student Outcome	Development of Engineering Solution (b) Engineering Design (c) Modern Tools Utilization (e) Multidisciplinary Teamwork (h)													
Learning Outcome	<ol style="list-style-type: none"> 1. Students are able to explain the concept of microprocessor, definition of microcontroller and microcontroller system, explain the types of microprocessors from the architectural side (harvard and von-neumann), set of instructors (RISC and CISC), as well as number of bits (8, 16, and 32-bit). 2. Students are able to explain minimal system on STM32F103 microcontroller, addressing (addressing), and input-output (IO). 3. Students are able to explain Serial communication protocol based on SPI, I2C and communication bus in the industry, as well as ADC, DAC and PWM 4. Students are able to design a simple system based on sensors and STM32F103 													
Topic	<ol style="list-style-type: none"> 1. Introducing about the concept of microprocessor, definition of microcontroller and microcontroller system. Explained about the types of microprocessors from the architectural side (harvard and von-neumann), set of instructors (RISC and CISC), as well as number of bits (8, 16, and 32-bit). 2. Introducing about the concept of ARM microprocessor and introduction of the IDE based on Keil uVision. 3. Introduction minimal system on STM32 microcontroller, addressing (addressing), and input-output (IO). 4. Communication systems commonly used in microcontroller systems include standart serial RS-232, SPI, I2C and bus communication in the industry. 5. Introduction pulse width modulation (PWM) includes its generation mechanism, its benefits, and its type. 6. Convert analog to digital (analogue to digital converter). 7. Recognize and basic programming on ADC of STM32 microcontroller. 													
Direct Assessment	<table border="1"> <thead> <tr> <th>Direct Assessment Plan</th> <th>Measured Learning Outcome</th> </tr> </thead> <tbody> <tr> <td>Engineering Design Assignment – Creating Proof of Concept</td> <td>LO3</td> </tr> <tr> <td>Engineering Design Assignment – Presenting the solution</td> <td>LO4</td> </tr> <tr> <td>Mid Exam</td> <td>LO1, LO2</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>		Direct Assessment Plan	Measured Learning Outcome	Engineering Design Assignment – Creating Proof of Concept	LO3	Engineering Design Assignment – Presenting the solution	LO4	Mid Exam	LO1, LO2				
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Engineering Design Assignment – Presenting the solution	LO4													
Mid Exam	LO1, LO2													
Indirect Assesment	Questionnaire (EDOM)													
References	[1] Carmine, N., 2018, Mastering STM32A step-by-step guide to the most complete ARM Cortex-M platform, using a free and powerful development environment based on Eclipse and GCC, Leanpub.													

	<p>[2] Peatman, J.B., 1988, Design With Microcontroller, McGraww Hillinternational Edition, Singapore.</p>
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	<p>[3] Alexandridis, N., 1995, Design of Microprocessor Based System, Prentice Hall, Singapore.</p>
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