



# HANYANG UNIVERSITY

## Hanyang International Summer School

<b>Faculty Information</b>	<b>Name</b>	Nyoman Bogi Aditya Karna				
	<b>E-mail</b>	aditya@telkomuniversity.ac.id				
	<b>Home University</b>	Telkom University				
	<b>Department</b>	Electrical Engineering				
	<b>Homepage</b>	<a href="https://aditya.staff.telkomuniversity.ac.id">https://aditya.staff.telkomuniversity.ac.id</a>				
<b>Course Information</b>	<b>Class No.</b>	TBA	<b>Course Code</b>	ISS1125	<b>Credits</b>	3
	<b>Course Name</b>	Microprocessor and IoT				
	<b>Lecture Schedule</b>	Tue-Fri /				
	<b>Course Description</b>	This course discusses about how microprocessor works, using x86 and RISC architectures as case studies, followed by its usage on microcontroller (case study: ARM/Atmel). The last 2 classes discuss about future research and enhancement possibilities in microprocessor world including IoT and its supporting technologies.				
	<b>Course Objective</b>	<ul style="list-style-type: none"> <li>- Students should be able to explain how microprocessor works by comparing x86 (case study: i8088) and RISC architecture (case study: ARM Cortex)</li> <li>- Students should be able to design and program microcontroller using ARM Cortex M3</li> <li>- Students should be able to design and program an IoT device using ARM-based Arduino system using emulator (TinkerCAD.com) and send its data to IoT Platform for analytic</li> <li>- Students should be able to explain the future trends of microprocessor technologies</li> </ul>				
	<b>Prerequisite</b>	Understanding on Logic Circuit and C Programming is needed but not mandatory				
	<b>Materials/Textbooks</b>	<ol style="list-style-type: none"> <li>1. Jacob Millman and Arvin Grabel, "Microelectronics 2<sup>nd</sup> ed.," McGraw-Hill, 1988</li> <li>2. John L. Hennessy and David A. Patterson, "Computer Architecture: A Quantitative Approach 4<sup>th</sup> ed.," Morgan Kaufmann, 2007</li> <li>3. William Hohl and Christopher Hinds, "ARM Assembly Language: Fundamentals and Techniques 2<sup>nd</sup> ed.," CRC Press, 2015</li> </ol>				
<b>Evaluation</b>	<b>Attendance</b>	0%	<b>Quiz</b>	20%		
	<b>Assignment</b>	0%	<b>Mid-term Exam</b>	20%		
	<b>Presentation</b>	0%	<b>Final Exam</b>	20%		
	<b>Group Project</b>	40%	<b>Participation</b>	0%		
	<b>Etc.</b>	<b>Evaluation Item</b>			<b>Ratio</b>	



				%
				%
<b>Daily Lecture Plan</b>	<b>Week 1</b>	Day 1	Story of Microprocessor and How it Works (Digital Transistor)	
		Day 2	Microprocessor and Memory Interaction (Hardware Perspective)	
		Day 3	Microprocessor and I/O Interaction (Hardware Perspective)	
		Day 4	Machine Instruction (case study: CISC-i8088 and RISC-ARM Cortex M3)	
	<b>Week 2</b>	Day 1	Pipeline in DLX Architecture, Hyper-Threading, Memory Management	
		Day 2	Parallel Processing and Hyper-Threading	
		Day 3	Memory Management (Data Caching)	
		Day 4	Midterm exam	
	<b>Week 3</b>	Day 1	Introduction to Microcontroller (case study: Microchip and ARM)	
		Day 2	Programming Microcontroller (case study: Arduino Uno and Raspberry Pi)	
		Day 3	Designing IoT Device: Sensor Input and Display Output (case study: Arduino Uno)	
		Day 4	Connecting to IoT Platform for Analytic, Reporting, and Controlling	
	<b>Week 4</b>	Day 1	Future Research on Microprocessor	
		Day 2	Best Project Presentation	
		Day 3	Final Exam	
		Day 4	Graduation	