Hanyang International Summer School

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<tr><td>Home University</td><td colspan="5">Telkom University</td></tr>
<tr><td>Department</td><td colspan="5">Electrical Engineering</td></tr>
<tr><td>Homepage</td><td colspan="5"></td></tr>
<tr><td rowspan="8">Course Information</td><td>Class No.</td><td>TBA</td><td>Course Code</td><td>ISS1125</td><td>Credits</td><td>3</td></tr>
<tr><td>Course Name</td><td colspan="5">Microprocessor and IoT</td></tr>
<tr><td>Lecture Schedule</td><td colspan="5">Mon-Thu /</td></tr>
<tr><td>Course Description</td><td colspan="5">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.</td></tr>
<tr><td>Course Objective</td><td colspan="5">- Students should be able to explain how microprocessor works by comparing x86 (case study: i8088) and RISC architecture (case study: ARM Cortex)
- Students should be able to design and program microcontroller using ARM Cortex M3
- 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
- Students should be able to explain the future trends of microprocessor technologies</td></tr>
<tr><td>Prerequisite</td><td colspan="5">Understanding on Logic Circuit and C Programming is needed but not mandatory</td></tr>
<tr><td>Materials/Textbooks</td><td colspan="5">1. Jacob Millman and Arvin Grabel, "Microelectronics 2nd ed.," McGraw-Hill, 1988
2. John L. Hennessy and David A. Patterson, "Computer Architecture: A Quantitative Approach 4th ed.," Morgan Kaufmann, 2007
William Hohl and Christopher Hinds, "ARM Assembly Language: Fundamentals and Techniques 2nd ed.," CRC Press, 2015</td></tr>
<tr><td rowspan="4">Evaluation</td><td>Attendance</td><td>%</td><td>Quiz</td><td colspan="2">20 %</td></tr>
<tr><td>Assignment</td><td>%</td><td>Mid-term Exam</td><td colspan="2">20 %</td></tr>
<tr><td>Presentation</td><td>%</td><td>Final Exam</td><td colspan="2">20 %</td></tr>
<tr><td>Group Project</td><td>40 %</td><td>Participation</td><td colspan="2">%</td></tr>
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			Evaluation Item	Ratio
	Etc.			%
				%
Daily Lecture Plan	**Week 1**	Day 1	Orientation & Opening Ceremony	
		Day 2	Story of Microprocessor and How it Works (Digital Transistor)	
		Day 3	Microprocessor and Memory Interaction (Hardware Perspective)	
		Day 4	Microprocessor and I/O Interaction (Hardware Perspective)	
	Week 2	Day 1	Machine Instruction (case study: CISC-i8088 and RISC-ARM Cortex M3)	
		Day 2	Pipeline in DLX Architecture, Hyper-Threading, Memory Management	
		Day 3	Parallel Processing and Hyper-Threading	
		Day 4	Memory Management (Data Caching)	
	Week 3	Day 1	Midterm exam	
		Day 2	Introduction to Microcontroller (case study: Microchip and ARM)	
		Day 3	Programming Microcontroller (case study: Arduino Uno and Raspberry Pi)	
		Day 4	Designing IoT Device: Sensor Input and Display Output (case study: Arduino Uno)	
	Week 4	Day 1	Connecting to IoT Platform for Analytic, Reporting, and Controlling	
		Day 2	Future Research on Microprocessor	
		Day 3	Best Project Presentation	
		Day 4	Final Exam	