

Tsuyama College		Year	2021		Course Title	Applied Digital Circuits
Course Information						
Course Code	0054		Course Category	Specialized / Compulsory		
Class Format	Lecture		Credits	School Credit: 2		
Department	Department of Integrated Science and Technology Communication and Informations System Program		Student Grade	3rd		
Term	Year-round		Classes per Week	2		
Textbook and/or Teaching Materials	Textbooks:Tadashige Matsuda and Tetsuya Sato,"An Introduction to Microcomputer Technologies(New Edition)"(CoronaPublishing Co.,LTD)					
Instructor	YABUKI Noboru					
Course Objectives						
Learning purposes : Understand the basics of digital circuit design and the basic operating principles and instructions of microcomputers, and learn the basic ideas of assembly language.						
Course Objectives : 1. To understand the basics of digital circuit design. 2. To understand the operating principles and instructions of microcomputers. 3. To write simple programs using assembly language.						
Rubric						
	Excellent	Good	Acceptable	Not acceptable		
Achievement 1	The student can explain digital circuit design in detail.	The student can explain digital circuit design sufficiently.	The student can explain the basics of digital circuit design (test).	The student can't explain the basics of digital circuit design.		
Achievement 2	The student can explain in detail the specific operating principles and instructions of a microcomputer.	The student can fully explain the basic operating principles and instructions of a microcomputer.	The student can explain the basic operations and instructions of a microcomputer (test).	The student can't explain the basic operation and instructions of a microcomputer.		
Achievement 3	The student can write a complex (concrete) program in an easy-to-understand manner using assembly language and use it as a model.	The student can write easy-to-understand programs using assembly language.	The student can write simple programs using assembly language (test).	The student can't write programs using assembly language.		
Assigned Department Objectives						
Teaching Method						
Outline	General or Specialized : Specialized Field of learning : Information system programming network Foundational academic disciplines : Information science, Computer engineering, and related fields / Computer system-related Relationship with Educational Objectives : This class is equivalent to "(3) Acquire deep foundation knowledge of the major subject area"  Relationship with JABEE programs : The main goal of learning / education in this class arer "(A)... A-2..."  Course outline : Following "Digital Basics" and in connection with "Digital Engineering", we will deal more professionally from the basics to applications of technologies related to microcomputers. In the early part of the term, we will explain the relationship between CPU operating principles and instructions, and the connection between hardware and software. In the later period, until the later mid-term test, the basics of digital circuit design will be addressed using Boolean algebra and Karnaugh maps in logic circuits, which are the basic elements of computers.  After the second half of the mid-term exam, we will explain the structure of the actual microcomputer and practice programming in assembly language.					
Style	Course method : Classes will be conducted using textbooks and supplementary materials, centered on board writing. Until the middle of the first semester, proceed with reference to the textbook used in the second grade digital basics. After that, proceed based on the text. Also, impose exercises and quiz reports to deepen understanding.  Grade evaluation method : Examination(70%)+Exercises and report assignments (30%). Regular examinations will be conducted 4 times, with each equally weighted. ・ Each test does not allow notebooks to be brought in. ・ For those who have less than 60 points in each regular test, supplementary lessons will be given, and if the understanding can be confirmed by the retest, the points may be changed. However, the evaluation after the change shall not exceed 60 points.					

Notice	<p>Precautions on the enrollment : Students must take this class (no more than one-fifth of the required number of class hours missed) and earn the credit in order to complete the 3rd year course.</p> <p>Course advice : The content of the lecture is closely related to the microcomputer experiment in Information Systems Engineering Experiment Practical Training II, so if you study in connection with it, you should deepen your understanding. Foundational subjects : Information Literacy (1st year), Digital Circuits (2nd), etc.</p> <p>Related subjects : Digital Engineering (3th year), Introduction to Computers (3th), Mathematical Information I (4th), Mathematical Engineering(4th), Information Theory(5th)</p> <p>Attendance advice : Try to learn in relation to the knowledge learned in other subjects as well as the microcomputer experiment conducted in Information System Engineering Experiment Training II. It is also related to the content of the digital technology certification. Check for late arrivals in quarters of class time.</p>
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#### Characteristics of Class / Division in Learning

<input type="checkbox"/> Active Learning	<input type="checkbox"/> Aided by ICT	<input checked="" type="checkbox"/> Applicable to Remote Class	<input type="checkbox"/> Instructor Professionally Experienced
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Must complete subjects

#### Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	Guidance, Computer overview [Basic configuration]	Understanding computer overview
		2nd	Basic configuration and function of computer [Program and processor]	Understanding the basic configuration of the computer
		3rd	Basic computer configuration and working basics [Hardware basic configuration]	Understanding the basic configuration of the computer
		4th	Basic computer configuration and working basics [Software basic configuration, and others]	Understanding the basic configuration of the computer
		5th	Microprocessor hardware [various bus operations, registers]	Understanding microprocessor hardware
		6th	Microprocessor hardware [various bus operations, registers]	Understanding microprocessor hardware
		7th	1st semester mid-term exam	See what you've learned so far
		8th	Return and commentary of exam answers	Review areas where learning is insufficient
	2nd Quarter	9th	Microprocessor hardware [various bus operations, registers]	Understanding microprocessor hardware
		10th	Microprocessor hardware [various bus operations, registers]	Understanding microprocessor hardware
		11th	Microprocessor hardware [various bus operations, registers]	Understanding microprocessor instruction sets
		12th	Microprocessor software 1 [Instruction set]	Understanding microprocessor instruction sets
		13th	Microprocessor software 2 [Addressing]	Understanding microprocessor addressing
		14th	Microprocessor software 3 [Machine language, Assembly language]	Understanding machine languages and assembly languages
		15th	(1st semester final exam)	See what you've learned so far
		16th	Return and commentary of exam answers	Review areas where learning is insufficient
2nd Semester	3rd Quarter	1st	Guidance, Basics of digital circuits [Binary, etc.]	Confirmation of the basics of digital circuits
		2nd	The basics of digital circuits [such as binary numbers]	Confirmation of the basics of digital circuits
		3rd	Logical circuits and logical designs [Boolean Al al tens and formulas]	Understanding Boolean algebra
		4th	Logical circuits and logical designs [Boolean Al al tens and formulas]	Understanding Boolean algebra
		5th	Logic circuit and logic design [Simplification of logic formula]	Understanding the simplification of formulas
		6th	Logic circuit and logic design [addition circuit]	Understanding the adder circuit
		7th	Logic circuit and logic design [Memory circuit etc.]	Understanding the memory circuit
		8th	2nd semester mid-term exam	See what you've learned so far
	4th Quarter	9th	Return and commentary of exam answers	Review areas where learning is insufficient
		10th	Microprocessor software 4 [machine language, assembly language]	Understanding machine language and assembly language
		11th	Actual microcomputer [PIC structure / program exercise]	Understanding the structure of PIC and creating programs
		12th	Actual microcomputer [PIC structure / program exercise]	Understanding the structure of PIC and creating programs
		13th	Actual microcomputer [PIC structure / program exercise]	Understanding the structure of PIC and creating programs
		14th	Actual microcomputer [PIC structure / program exercise]	Understanding the structure of PIC and creating programs
		15th	(2nd semester final exam)	See what you've learned so far
		16th	Return and commentary of exam answers	Review areas where learning is insufficient

#### Evaluation Method and Weight (%)

	Examination	Assignments / Mini test	Total
Subtotal	70	30	100
Basic Proficiency	0	0	0
Specialized Proficiency	70	30	100
Cross Area Proficiency	0	0	0