

Tsuyama College		Year	2021		Course Title	Digital Circuits
Course Information						
Course Code	0029		Course Category	Specialized / Compulsory		
Class Format	Lecture		Credits	School Credit: 1		
Department	Department of Integrated Science and Technology Communication and Informations System Program		Student Grade	2nd		
Term	Year-round		Classes per Week	1		
Textbook and/or Teaching Materials	Textbook : "The Logic Circuits:From Foundations to Appllications"(Morikita Syuppan)					
Instructor	ONISHI Atsushi					
Course Objectives						
Learning purposes : To understand the theory to express and to process data in binary number.						
Course objectives: 1. To understand the system of the number and the theory to express data in binary number. 2. To understand the way of data expressions in the computer. 3. To understand the concepts to be related to the logical function. 4. To understand the features of representative combinational logical circuits.						
Rubric						
	Excellent	Good	Acceptable	Not acceptable		
Achievement 1	The student can achieve radix conversion, negative number representation and floating-point number representation perfectly. And the student can also understand many kinds of data perfectly.	The student can achieve radix conversion, negative number representation and floating-point number representation generally. And the student can also understand many kinds of data generally.	The student understands the theory of radix conversion, negative number representation and floating-point number representation.	The student will not understand the theory of radix conversion, negative number representation and floating-point number representation.		
Achievement 2	The student can express and understand the data perfectly according to the rule.	The student can express and understand the data generally according to the rule.	The student understands the rule of the data expression.	The student will not understand the rule of the data expression.		
Achievement 3	The student can explain concepts related to logical functions perfectly and apply these concepts perfectly.	The student can explain the concepts to be related the logical function generally and apply these concepts generally.	The student can explain the function of the designated fundamental logical function.	The student can not explain the function of the designated fundamental logical function.		
Achievement 4	The student can explain the function of the representative combinational logical circuits in the computer perfectly.	The student can explain the function of the representative combinational logical circuits in the computer generally.	The student can explain the function of the several combinational logical circuits in the computer generally.	The student can explain the function of none of the representative combinational logical circuits in the computer generally.		
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 fundation knowledge of the major subject area". Relationship with JABEE programs : The main goal of learning / education in this class is "(A)". Course outline : The student acquires the fundamentals to learn deeply about computer hardware.					
Style	Course method : Face-to-face class with the blackboard and some paper materials. The teacher sometimes gives his students some homework and quizzes. Grade evaluation method : Exams(70%) + Reports(30%). Regular examinations will be conducted 2 times. The teacher does not allow textbooks or notes in exams. The teacher does not permit retests without penalty.					

Notice	<p>Precautions on the enrollment : Students must take this class (no more than one-third of the required number of class hours missed) and earn the credit in order to complete the 2nd year course.</p> <p>Course advice: As a preparatory study, the students are required to review the contents of Information Literacy. Focus of class is the fundamentals for computer science, so the student should complete all homework.</p> <p>Fundational subjects : Information Literacy(1st year) Related subjects : Digital Engineering(3rd year), Applied Digital Circuits(3rd), Mathematical Information(4th), Mathematical Engineering(5th), Information Theory(5th)</p> <p>Attendance advice : If you are late for the role call twice, you will be treated as absence. The teacher considers that ths student was absent once when late twice. The student should not be late for the class so that the student can receive materials surely.</p>

Characteristics of Class / Division in Learning

<input type="checkbox"/> Active Learning	<input type="checkbox"/> Aided by ICT	<input 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	
		2nd	Relations of the computer and binary number	Understanding the reason why binary number is used
		3rd	Summary of the number expression	Understanding the way of the number expression
		4th	Binary number	Understanding the features of binary number expression
		5th	Octal number, hexadecimal number	Understanding the features of octal number and hexadecimal number expression
		6th	Radix conversion	Understanding how to achieve radix conversion
		7th	Negative number	Understanding the features of negative number expression
		8th	1st semester mid-term exam	
	2nd Quarter	9th	Return and commentary of exam answers	
		10th	Fixed-point number representation, floating-point number representation	Understanding the features of the fixed-point number representation and the floating-point number representation
		11th	Precautions about the floating -point number representation	Understanding the precautions about the floating-point number representation
		12th	Code	Learning how to code data
		13th	BCD code, character code	Understanding the features of BCD code and the character code
		14th	Input and output of digital data	Understanding the precautions when digital data is inputted and outputted
		15th	(1st semester final exam)	
		16th	Return and commentary of exam answers	
2nd Semester	3rd Quarter	1st	Error checking code	Understanding the features of the error checking code
		2nd	Error correcting code	Understanding the features of the error correcting code
		3rd	Basic concepts of logical operation	Understanding the basic concepts of logical operation
		4th	Logical function	Understanding what the logical function is
		5th	Logic gate	Learning the symbols of the logic gates
		6th	Boolean algebra	Understanding boolean algebra
		7th	Normal form	Learning the normal forms of the logical formula
		8th	Analysis of the logical formula using a figure	Learning venn diagram and karnaugh map
	4th Quarter	9th	2nd semester mid-term exam	
		10th	Return and commentary of exam answers	
		11th	NAND, NOR, XOR	Learning NAND operation, NOR operation and XOR operation
		12th	De Morgan's theorem	Learning De Morgan's theorem
		13th	Transformation of the logical circuit	Learning how to transform between NOR form, NAND form, conjunctive canonical form and disjunctive canonical form
		14th	Representative combinational logical circuit	Learning adder, decoder, selector and buffer
		15th	(2nd semester final exam)	
		16th	Return and commentary of exam answers	

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Report	Other	Total
Subtotal	70	0	0	0	30	0	100

Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	70	0	0	0	30	0	100
Cross Area Proficiency	0	0	0	0	0	0	0