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| 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. | | | | | |

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| 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

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| <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 |
|--|---------------------------------------|--|--|

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 |