Tsuyama College	Year	2024	Course Title	Experiments of Electronic and Computer Systems

Course Information

Course Code	0021	Course Category	Specialized / Compulsory
Class Format	Experiment	Credits	School Credit: 4
Department	Advanced Electronics and Information System Engineering Course	Student Grade	Adv. 1st
Term	Year-round	Classes per Week	4
Textbook and/or Teaching Materials			
Instructor	NAKAMURA Shigeyuki,ONISHI Atsushi,SORI Hitoshi		

Course Objectives

Learning objectives: To acquire teamwork skills through organized experiments in circuit design, control design, network design, etc., and at the same time, to deepen basic knowledge and problem-solving skills.

Objectives:
1.To deepen students' basic knowledge of circuits, controls, networks, and other technologies.
2. To be able to summarize the results of experiments in a report using easy-to-understand diagrams and text.
◎To be able to demonstrate teamwork skills and work systematically to solve problems.
◎Develop design skills, such as the ability to find a problem clearly and find the most appropriate solution or method.
◎To be able to carry out experiments systematically according to a schedule

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	To be able to fully understand the basic principles and phenomena of circuits, control, networks, and other technologies through experiments, to further deepen their knowledge, and to provide technical instructions and information to other students.	Understand and deepen their knowledge of basic principles and phenomena related to circuits, control, networks, and other technologies through experiments, and be able to conduct experiments autonomously.	Be able to conduct experiments on circuits, controls, and networks with specific help from other members of the group on some of the content.	Unable to conduct experiments on technologies such as circuits, control, and networks.
Achievement 2	To be able to logically summarize the validity evaluation and discussion of experimental results in a report with instructions and corrections from others.	With strong instructions and corrections from others, they can barely summarize the validity evaluation and discussion of the experimental results in a report.	It is not possible to summarize the evaluation of the validity of the experimental results and the discussion in the report.	Be able to control the actions of members to achieve goals so that appropriate communication can take place among members.
Achievement 3	By getting specific help from other members, you can accomplish your role and goals.	Can't accomplish my roles and goals.	Be able to use basic knowledge of circuits, control, networks, and other technologies to find appropriate ways to solve problems and instruct other students.	Use basic knowledge of circuits, control, networks, and other technologies to judge the appropriateness of problem solving methods proposed by other students, or to propose modifications.
Achievement 4	Can't judge whether the problem-solving methods proposed by other students, etc. are appropriate or not.	Be actively involved in the planning and execution of the experiment so that not only you but also other members can achieve the goal as planned.	Be able to act autonomously to achieve goals according to a set plan.	Under the guidance of others, be able to take action to achieve goals according to a set plan.

Assigned Department Objectives

Teaching Method

Outline	General or Specialized : Specialized Field of Study: Experimental and Practical Required/Elective: Required Underlying disciplines: Electrical and electronic engineering and related fields/control and systems engineering related, information science, information engineering and related fields/information networks related Relationship to learning and educational goals: This course corresponds to the learning goal of the major: "(3) Through practical learning in special experiments, students will deepen their understanding of knowledge related to the specialized technical field, and at the same time, acquire the ability to carry out experiments and analyze and consider data. These subjects are equivalent to the following Relationship with JABEE programs : The main goal of learning / education in this class is "(C), C-2", also "A-2", "C-1", "D-1" and "D-2" are involved. Outline of the class: In the special experiments, students will systematically engage in experiments related to the content studied in this course in order to develop teamwork skills that are essential in the field of engineering.

Style	Method of teaching: In the experiments of electrical and electronic systems, students are not divided into groups and conduct experiments on two themes in 15 weeks. For the information experiments, students will be divided into two groups and each group will conduct experiments for seven weeks. In each experiment, students are required to cooperate with each other and work on the problem systematically, keeping in mind the development of teamwork skills. Three teachers will be in charge of each experiment. Students are required to submit a report for each theme. The method of conducting each experiment is as follows. For the experiments in electrical and electronic engineering, two themes shown in the lesson plan will be conducted in 15 weeks. (In charge: Nakamura). Guidance will be given in the first week. The method of conducting the experiments is as follows. Students will devise, design, fabricate, program, and experiment with electric and electronic circuits as teaching materials, with an eye to entering various electrical, electronic, and information contests. Students will be divided into groups of several and work together to develop teamwork skills. Students design and fabricate a printed circuit board and enter it in a contest. The teacher write down the ratio of evaluation for the activity in the school hour and evaluation for the activity out of the school hour on another paper. Experiments on information systems will be conducted in two groups, with seven weeks of experiments per group, for a total of 15 weeks. (In charge: Onishi, Sori). Guidance will be given in the first week. How to conduct Onishi's experiment The first half of the week is spent investigating a small problem to be solved each week, and the second half is spent conducting experiments based on the results of the investigation. Each student will have a different background in the subject before entering the major course. Students will be assigned to different roles based on their abilities and interests, and will work together to ensure that all students have the same level of knowledge and skills at the end of each week's experiment. In order to confirm that the cooperation is successful, the students are required to construct a network in the campus using the knowledge and skills they have acquired in the last week of the experiment. Grading method: Each teacher in charge of the experiment will evaluate (100%), and the average score will be used for evaluation. The teacher in charge of the experiment will evaluate the students based on the learning objectives and achievement goals of this course, using the following evaluation method as a basis, but the details of the evaluation may differ from person to person. Evaluation method Each week, students are asked to mutually evaluate the status of their roles and the achievement of their roles. The teacher will evaluate the teamwork skills based on the results (70%). The teacher will evaluate the teamwork skills based on the results (70%), and the level of knowledge and skills achieved will be evaluated by the experiment report (30%). The teacher write down the ratio of evaluation for the activity in the school hour and evaluation for the activity out of the school hour on another paper. Method of conducting the experiment in charge of Sori Students will be divided into groups of three to four students to conduct experiments on the tasks set each week. Students will be divided into groups of 3 or 4 students per group and will be assigned roles based on their abilities and interests. Students should work together to ensure that all students have the same level of knowledge and skills at the end of each week's experiment. In the final week's experiment, students will design a motor control system controller for a four-wheeled vehicle and conduct a demonstration experiment using the knowledge and skills they have acquired so far, in order to confirm that the cooperation and teamwork skills have been established. The teacher write down the ratio of evaluation for the activity in the school hour and evaluation for the activity out of the school hour on another paper.
Notice	Precautions on the enrollment : This course requires students to study outside of class hours. 15 credit hours per credit hour are offered, but 30 credit hours of study are also required. Students are required to study 30 credit hours. Course advice: This is a valuable opportunity to understand the basic techniques of engineering technology through experiments, and I hope that students will understand this and take it seriously. The details and the level which each student got through his/her past study are uneven. So each student should try to rise the member's intelligence as well as own intelligence in cooperation with the members. Foundational subjects: Digital Engineering I, II (Information 2, 3), Electronic Circuits I, II (Electrical and Electronic 3, 4), Control Engineering (Electrical and Electronic 4), Information Processing (Electrical and Electronic 5), Control Engineering I, II (Information 4, 5), Information Network (Information 4), Information and Communication Engineering (Information 5), etc. Related courses: Special Research on Electronics and Information Systems (2nd year), etc. Attendance advice: The above lesson plan is an example, and actual progress may vary. The above lesson plan is an example, and actual progress may vary. You will be given instructions on how to proceed in your group and precautions to take during the guidance, so be sure to attend and confirm the instructions. Late arrivals will also be instructed in the guidance. Unlike the experiments in this course, we will not give detailed instructions on the contents of the experiments, how to collect data, and how to compile reports.

Characteristics of Class / Division in Learning

☑ Active Learning	☑ Aided by ICT	☐ Applicable to Remote Class	☐ Instructor Professionally Experienced

Required subjects

Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	Guidance for Electrical and Electronic Experiments	
		2nd	Experiments [Invention, design and fabrication of microcomputer circuits, programming and operation experiments] (Activity out of the school hour : Generating the reports)	Completion of the 1st electrical and electronic experiments based on group activities
		3rd	Experiments [Invention, design and fabrication of microcomputer circuits, programming and operation experiments] (Activity out of the school hour : Generating the reports)	Completion of the 2nd electrical and electronic experiments based on group activities

		4th	Experiments [Invention, design and fabrication of microcomputer circuits, programming and operation experiments] (Activity out of the school hour : Generating the reports)	Completion of the 3th electrical and electronic experiments based on group activities
		5th	Experiments [Invention, design and fabrication of microcomputer circuits, programming and operation experiments] (Activity out of the school hour : Generating the reports)	Completion of the 4th electrical and electronic experiments based on group activities
		6th	Experiments [Invention, design and fabrication of microcomputer circuits, programming and operation experiments] (Activity out of the school hour : Generating the reports)	Completion of the 5th electrical and electronic experiments based on group activities
		7th	Experiments [Invention, design and fabrication of microcomputer circuits, programming and operation experiments] (Activity out of the school hour : Generating the report)	Completion of the 6th electrical and electronic experiments based on group activities
		8th	Revision of reports and additional experiments (Activity out of the school hour : Revision of reports)	Completion of all electrical and electronic
	2nd Quarter	9th	Experiment [Design and fabrication of printed circuit boards] (Activity out of the school hour : Generating the reports)	Completion of the 7th electrical and electronic experiments based on group activities
		10th	Experiment [Design and fabrication of printed circuit boards] (Activity out of the school hour : Generating the reports)	Completion of the 8th electrical and electronic experiments based on group activities
		11th	Experiment [Design and fabrication of printed circuit boards] (Activity out of the school hour : Generating the reports)	Completion of the 9th electrical and electronic experiments based on group activities
		12th	Experiment [Design and fabrication of printed circuit boards] (Activity out of the school hour : Generating the reports)	Completion of the 10th electrical and electronic experiments based on group activities
		13th	Experiment [Design and fabrication of printed circuit boards] (Activity out of the school hour : Generating the reports)	Completion of the 11th electrical and electronic experiments based on group activities
		14th	Experiment [Design and fabrication of printed circuit boards] (Activity out of the school hour : Generating the reports)	Completion of the 12th electrical and electronic experiments based on group activities
		15th	Apply a contest	Completion of all electrical and electronic
		16th		
2nd Semester	3rd Quarter	1st	Guidance for Information System Experiment	
		2nd	Experiments [Design and construction of network systems] (Activity out of the school hour : Generating the reports)	Completion of the 1st network experiment based on group activities
		3rd	Experiments [Design and construction of network systems] (Activity out of the school hour : Generating the reports)	Completion of the 2nd network experiment based on group activities
		4th	Experiments [Design and construction of network systems] (Activity out of the school hour : Generating the reports)	Completion of the 3rd network experiment based on group activities
		5th	Experiments [Design and construction of network systems] (Activity out of the school hour : Generating the reports)	Completion of the 4th network experiment based on group activities
		6th	Experiments [Design and construction of network systems] (Activity out of the school hour : Generating the reports)	Completion of the 5th network experiment based on group activities
		7th	Experiments [Design and construction of network systems] (Activity out of the school hour : Generating the reports)	Completion of the 6th network experiment based on group activities
		8th	Revision of the reports and additional experiments (Activity out of the school hour : Revision of th reports)	Completion of the network experiment and submission of the report
	4th Quarter	9th	Experiments [Embedded programming with H8 microcomputers] (Activity out of the school hour : Generating the reports)	Completion of the 1st network experiment based on group activities

		10th	Experiments [Embedded programming with H8 microcomputers] (Activity out of the school hour : Generating the reports)	Completion of the 2nd network experiment based on group activities
		11th	Experiments [Embedded programming with H8 microcomputers] (Activity out of the school hour : Generating the reports)	Completion of the 3rd network experiment based on group activities
		12th	Experiment [Control simulation using MATLAB] (Activity out of the school hour : Generating the reports)	Completion of the 4th network experiment based on group activities
		13th	Experiment [Four-wheel motor control experiment] (Activity out of the school hour : Generating the reports)	Completion of the 5th network experiment based on group activities
		14th	Experiment [Four-wheel motor control experiment] (Activity out of the school hour : Generating the reports)	Completion of the 6th network experiment based on group activities
		15th	Revision of reports, additional experiments (Activity out of the school hour : Revition of reports)	Completion of all experiments and submission of reports, grade confirmation
		16th		

Evaluation Method and Weight (%)

	Examination	Presentation	mutual evaluation	Behavior	Report	Other	Total
Subtotal	0	0	70	0	30	0	100
Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	0	0	0	0	30	0	30
Cross Area Proficiency	0	0	70	0	0	0	70