

Akashi College		Year	2022		Course Title	Advanced Electrical Circuits	
Course Information							
Course Code		4024		Course Category		Specialized / Elective	
Class Format		Lecture		Credits		Academic Credit: 2	
Department		Mechanical and Electronic System Engineering		Student Grade		Adv. 1st	
Term		Second Semester		Classes per Week		2	
Textbook and/or Teaching Materials							
Instructor		HOSOKAWA Atsuishi					
Course Objectives							
1) Understand the various theorems that form the basis for electrical circuit analysis. 2) Can perform analysis and design of a number of electrical circuits. 3) Can select and use appropriate methods for analyzing and designing electrical circuits, with multidimensional thinking.							
Assignments will be handed out for review purposes at the end of the lecture. It is important to do them through self-study.							
Rubric							
		Ideal Level		Standard Level		Unacceptable Level	
Achievement 1		Understand the various theorems that form the basis for electrical circuit analysis and can use them for circuit analysis.		Understand the various theorems that form the basis for electrical circuit analysis.		Do not understand the various theorems that form the basis for electrical circuit analysis.	
Achievement 2		Can perform analysis and design various complex electrical circuits.		Can perform analysis and design various basic electrical circuits.		Cannot perform analysis and design various basic electrical circuits.	
Achievement 3		Can select and use the most appropriate method for analyzing and designing electrical circuits.		Can select and use an appropriate method for analyzing and designing electrical circuits.		Cannot select and use an appropriate method for analyzing and designing electrical circuits.	
Assigned Department Objectives							
Teaching Method							
Outline		An electrical circuit is a circuit made up of elements of resistance, inductance, and capacitance. It forms the basis for electrical engineering including electronic, communication, and information engineering. The aim of this course is to learn about the relationship between current and voltage in electrical circuits and to be able to perform circuit analysis.					
Style		Classes are mainly conducted by taking notes. There will be handouts as necessary. There will be exercises and assignments every week.					
Notice		This course's content will amount to 90 hours of study in total. These hours include the learning time guaranteed in classes and the standard self-study time required for pre-study / review, and completing assignment reports. This course assumes students have taken Electrical Circuits I and II, Circuit Theory, and Transient Analysis on Electric Circuits (compulsory in years 1 to 4) taught in the Electrical and Computer Engineering Department, or have taken Electrical and Electronics Engineering I (compulsory in year 4), and Electrical and Electronics Engineering II (selected for year 5) taught in the Mechanical Engineering Department in Akashi Kosen. Students need to have a basic knowledge of the contents of these subjects. If students wish, they can take a midterm exam outside of class hours. The evaluation for the exam in this case will be the average score of the midterm and final exams. Students who miss 1/4 or more of classes will not be eligible for a passing grade.					
Characteristics of Class / Division in Learning							
☐ Active Learning		☐ Aided by ICT		☒ Applicable to Remote Class		☐ Instructor Professionally Experienced	
Course Plan							
			Theme		Goals		
2nd Semester	3rd Quarter	1st	AC circuits		Understand how to analyze AC circuits using the vector notation and vector locus.		
		2nd	Circuit analysis and miscellaneous theorems (1)		Understand how to analyze circuits using closed circuit and node equations.		
		3rd	Circuit analysis and miscellaneous theorems (2)		Understand how to analyze circuits using the superposition, reciprocity, and compensation theorems.		
		4th	Circuit analysis and miscellaneous theorems (3)		Understand the methods of circuit analysis using Thévenin's, Norton's, and Millman's theorems.		
		5th	Resonant circuits and mutual induction circuits		Understand resonant and mutual induction circuits.		
		6th	Three-phase AC		Understand voltage, currents, and power in three-phase AC.		
		7th	Distorted wave AC		Understand voltage, currents and power in distorted wave AC.		
		8th	Summary of weeks 1 to 7		Understand the content from weeks 1 to 7.		
	4th Quarter	9th	One-port circuits		Understand one-port circuits.		
		10th	Two-port circuits		Understand the various parameters that represent two-port circuits.		

		11th	Transient phenomena in single-energy circuits	Understand the transient phenomena in circuits where either inductance or capacitance is present.
		12th	Transient phenomena in multiple-energy circuits	Understand the transient phenomena in circuits where both inductance and capacitance are present.
		13th	Steady-state phenomena in distributed-element circuits	Understand the basic concepts and circuit properties of transmission lines where resistance, inductance, and capacitance are distributed along lines.
		14th	Transient phenomena in distributed-element circuits	Understand the transient phenomena in distributed-element circuits.
		15th	Summary of weeks 8 to 14	Understand the content from weeks 8 to 14.
		16th	Final exam	Understand the content from weeks 1 to 7 and weeks 9 to 14.

Evaluation Method and Weight (%)

	Examination	Exercise	Total
Subtotal	70	30	100
Basic Proficiency	0	0	0
Specialized Proficiency	70	30	100
Cross Area Proficiency	0	0	0