Course Cote	Anan College		Year	Year 2024			ourse Title	Electrical Circuit Theory 1	
Course Code 1312-01									
Department Course of Electrical Engineering Student Grade 2nd						Course Categor	ry	Specialized / Compulsory	
Textbook and/or Teaching Materials Introductory electrical circuit, basics (Ohmsha) Introductory electrical circuit, basics (Ohmsha) Instructor Nakamura Yuichi Course Objectives 1. Understand the relationship between current, voltage, and resistance using Ohm's law, and be able to calculate combined 2. Understand Hierarchin Steprens, superposition theorem, and Millman's theorem and be able to apply them to DC circuit calculations. 3. Understand Thevenin's theorem, superposition theorem, and Millman's theorem and be able to calculate combined 2. Understand various methods of expressing since wave alternating current and be able to calculate frequency, phase, effective value, etc. 3. Understand the relationship between sinusoidal AC voltage and current in R, L, and C elements, and be able to calculate voltage, etc. 3. Understand the relationship between sinusoidal AC voltage and current in R, L, and C elements, and be able to calculate voltage, etc. 4. Understand various methods and parallel circuits, as well as the current combines series and parallel circuits, as well as the current combines series and parallel circuits, as well as the current and calculations can be performed. 4. Achievement 2 By applying Kinchfoff's laws, circuit equalities for various can be derived and calculations can be performed. 4. Albeit to explain at least two of theorem, superposition of theorem, superposition of theorem and apply theorem and apply theorem and apply theorem and apply composition of theorem, and theorem, and theorem, and will calculate frequencies, effective values, etc. Achievement 3 Achievement 4 Achievement 5 Achievement 5 Achievement 5 Achievement 6 Achievement 7 Achievement 7 Achievement 8 Achievement 9 Achievement 9 Achievement 9 Achievement 9 Achievement 10			Lecture					School Cr	edit: 2
Tractions and/or Traceting Metarical circuits. basics (Ohmsha) Instructor Naleamura Yuichi Naleamura Yaichi Naleamura Yuichi Naleamura Yaichi Naleamura Yaichi Naleamura Alaeamura Alea Bable to apply them to D.C. circuit taleulations. Nalea Yaichi Yaichi Salea Y			Course of E	lectrical Engine	ering	Student Grade		2nd	
Tracking Materials Introductory record of the properties Nakamura Yuichi						Classes per We	eek	前期:2 後	朝:2
Discretive Course Objective Discretive Discretiv			Introductor						
1. Understand the relationship between current, voltage, and resistance using Ohm's law, and be able to calculate combined resistance. 2. Understand Thevenin's theorem, superposition theorem, and Milliman's theorem and be able to apply them to DC circuit actualitions. 3. Understand the relationship between sinusoidal AC voltage and current in R, L, and C elements, and be able to calculate requency, phase, effective value, etc. 5. Understand the relationship between sinusoidal AC voltage and current in R, L, and C elements, and be able to calculate volt current, and impedance in a series circuit. Rubric Ideal Level	Instructor	•	Nakamura	Yuichi					
resistance. 2. Understand kirchhoff's laws and be able to apply them to DC circuit calculations. 4. Understand various methods of expressing sine wave alternating current and be able to apply them to DC circuit calculations. 4. Understand the relationship between sinusoidal AC voltage and current in R, L, and C elements, and be able to calculate requency, phase, effective value, etc. 5. Understand the relationship between sinusoidal AC voltage and current in R, L, and C elements, and be able to calculate volt current, and impedance in a series circuit. Rubric Ideal Level	Course (Objective	es						
Ideal Level	 Understand the relationship between current, voltage, and resistance using Ohm's law, and be able to calculate combined resistance. Understand Kirchhoff's laws and be able to apply them to DC circuit calculations. Understand Thevenin's theorem, superposition theorem, and Millman's theorem and be able to apply them to DC circuit calculations. Understand various methods of expressing sine wave alternating current and be able to calculate frequency, phase, effective value, etc. Understand the relationship between sinusoidal AC voltage and current in R, L, and C elements, and be able to calculate voltage, 								
Achievement 1 Understand Ohm's law and be able to calculate the combined resistance, of a circuit that combines series and parallel croutly, as well as the current, and voltage of each part. Achievement 2 Dy applying Krichloff's laws, circuit calculations for various calculations can be performed accurately. Achievement 3 Di derstand Thevenin's theorem, superposition theorem, and Milliams's theorem and apply them to DC circuit calculations. Dinderstand the Correspondence between sine wave alternating functions, active, so the able to calculate the carbon theorem, of the correspondence between sine wave alternating functions, and be able to apply them to accurately and apply them to accurately accurately and apply them to accurately accurately and apply them to accurately accurately accurately accurately accurately accurate accurately accurately accurate accurately accurately accurately accurate accurate accurately accurate accurate accurately accurate accurate accurate accurately accurate accura	Rubric								
Achievement 1 Understand Ohm's law and be able to calculate the combined resistance, of a circuit that combines series and parallel croutly, as well as the current, and voltage of each part. Achievement 2 Dy applying Krichloff's laws, circuit calculations for various calculations can be performed accurately. Achievement 3 Di derstand Thevenin's theorem, superposition theorem, and Milliams's theorem and apply them to DC circuit calculations. Dinderstand the Correspondence between sine wave alternating functions, active, so the able to calculate the carbon theorem, of the correspondence between sine wave alternating functions, and be able to apply them to accurately and apply them to accurately accurately and apply them to accurately accurately and apply them to accurately accurately accurately accurately accurately accurate accurately accurately accurate accurately accurately accurately accurate accurate accurately accurate accurate accurately accurate accurate accurate accurately accurate accura	_			Ideal Level		Standard Level			Minimum achievement level
Achievement 2 Circuit equations for various can be derived and calculations can be performed accurately.	Achievement 1			able to calculate the combined resistance of a circuit that combines series and parallel circuits, as well as the current		Able to calculate the combined resistance, current, and voltage of each part of a basic circuit		nd voltage circuit	of each part of a simple circuit
Achievement 3 theorem, and Millman's theorem, and Millman's theorem and apply them to DC circuit calculations. Understand the correspondence between sine wave alternating current and trigonometric functions, vectors, and complex numbers, and be able to calculate frequencies, effective values, etc. Achievement 4 Achievement 5 Achievement 5 Achievement 5 Achievement 5 Achievement 6 Achievement 7 Achievement 8 Achievement 9 Achievement 19 Achievement 20 Achievement 19 Achievement 20 Achievement 20 Achievement 20 Achievement 20 Achievement 20 Achievement 30 Achievement 20 Achievent 19 Achievent 20 Achievement 30 Achievent 20 Achievent	Achievement 2			circuit equation circuits can be calculations car	s for various derived and	rs laws, various equations for basic circuits ca		cuits can	Kirchhoff's laws and perform
between sine wave alternating current and trigonometric functions, vectors, and complex numbers, and be able to calculate frequencies, effective values, etc. Achievement 5 Achievement 6 Achievement 7 Achievement 8 Achievement 9 Achievent 15 Achievement 16 Achievement 9 Achievent 16 Achi	Achievement 3			theorem, superposition theorem, and Millman's theorem and be able to apply		Thevenin's theorem, superposition theorem, and Millman's theorem and apply		ı. and	superposition theorem, or Millman's theorem to
Achievement 5 Able to explain the characteristics of R, L, and C elements. Understand, explain, and calculate the relationship between voltage, current, and impedance of a series circuit. Assigned Department Objectives 学習・教育到達度目標 D-1 Teaching Method Outline The purpose of this course is to acquire the introductory part of electrical circuit theory, which is essential basic knowledge in electrical and electronic engineering. The first half deals with DC circuits, which are the basis of electrical circuit theory. Understand Ohm's law and Kirchhoff's law, and learn how to calculate voltage, current, and resistance in circuits. Understand Thevenin's theorem, the superposition theorem, and learns about efficient circuit calculations. In the second half, it will be explained the basics of AC circuits. Understand how to express sinusoidal alternating current using trigonometric functions, vectors, and connumbers, and the concepts of frequency and phase. Learns about the properties of R, L, and C elements and the impedance of series circuits. Notice It is important not only to memorize Ohm's law and Kirchhoff's law as formulas, but also to fully underst the physical relationships among voltage, current, and resistance. Also, in order to understand AC circuits, you need knowledge about vectors, trigonometric functions, and complex numbers, so review what you learned in mathematics and acquire calculation skills. Characteristics of Class / Division in Learning Active Learning Active Learning Active Learning Active Learning Able to apply there to calculations. Able to apply there to calculations. Descriptions and bable to apply them to calculations.	Achievement 4			between sine wave alternating current and trigonometric functions, vectors, and complex numbers, and be able to calculate frequencies, effective between sine was current and trigofunctions or com and be able to c frequencies, effective		yave alternating gonometric mplex numbers, calculate		Able to understand and explain the correspondence between sine wave alternating current and trigonometric functions or	
学習・教育到達度目標 D-1 Teaching Method Outline	Achievement 5			characteristics of R, L, and C elements. Understand, explain, and calculate the relationship between voltage, current, and		characteristics of R, L, and C elements. Ability to calculate voltage, current, and impedance of a		tage,	characteristics of R, L, and C
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Style Dasic knowledge in electrical and electronic engineering.	Teaching	g Method							
Style Understand Ohm's law and Kirchhoff's law, and learn how to calculate voltage, current, and resistance in circuits. Understand Thevenin's theorem, the superposition theorem, and learns about efficient circuit calculations. In the second half, it will be explained the basics of AC circuits. Understand how to express sinusoidal alternating current using trigonometric functions, vectors, and con numbers, and the concepts of frequency and phase. Learns about the properties of R, L, and C elements and the impedance of series circuits. It is important not only to memorize Ohm's law and Kirchhoff's law as formulas, but also to fully underst the physical relationships among voltage, current, and resistance. Also, in order to understand AC circuits, you need knowledge about vectors, trigonometric functions, and complex numbers, so review what you learned in mathematics and acquire calculation skills. Characteristics of Class / Division in Learning Active Learning Active Learning Added by ICT Applicable to Remote Class Instructor Professionall' Experienced Understand various laws in DC circuits and be able to apply them to calculations.	Outline		basic know	vledge in electrical and electronic engineering.					
Notice the physical relationships among voltage, current, and resistance. Also, in order to understand AC circuits, you need knowledge about vectors, trigonometric functions, and complex numbers, so review what you learned in mathematics and acquire calculation skills. Characteristics of Class / Division in Learning Active Learning Alded by ICT Applicable to Remote Class Instructor Professionall' Experienced	Style	Understand Ohm's law and Kirchhoff's law, and learn how to calculate voltage, current, and resistance in DC circuits. Style Style Understand Thevenin's theorem, the superposition theorem, and learns about efficient circuit calculations. In the second half, it will be explained the basics of AC circuits. Understand how to express sinusoidal alternating current using trigonometric functions, vectors, and complex numbers, and the concepts of frequency and phase.							
Active Learning Aided by ICT Applicable to Remote Class Instructor Professionalling Experienced Course Plan Theme Goals Understand various laws in DC circuits and be apply them to calculations	It is important not only to memorize Ohm's law and Kirchhoff's law as formulas, but also to fully understand the physical relationships among voltage, current, and resistance. Also, in order to understand AC circuits, you need knowledge about vectors, trigonometric functions, and								
Course Plan Theme Goals Understand various laws in DC circuits and b	Characteristics of Class / Division in Learning								
Theme Goals Understand various laws in DC circuits and b	□ Active Learning □ Aided by ICT □ Applicable to Remote Class □ Instructor Professionally Experienced						☐ Instructor Professionally Experienced		
Theme Goals Understand various laws in DC circuits and b									
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Able to explain the concepts of current, voltage, resistance Able to explain the concepts of current, voltage, resistance	1st Someote 1st 1ct 1 DC circuit (1) Current/veltage/re			Understand various laws in DC circuits and be					

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		2nd	1. DC circuit (1) Current/voltage/resistance	Understand various laws in DC circuits and be able to apply them to calculations. Able to explain the concepts of current, voltage, and resistance.
		3rd	1. DC circuit (2) Power, energy, Ohm's law, combined resistance	Understand various laws in DC circuits and be able to apply them to calculations. Understand the concept of electric power and electric energy and be able to calculate it. Understand Ohm's law and be able to calculate current, voltage, resistance, and combined resistance.
		4th	DC circuit (2) Power, energy, Ohm's law, combined resistance	Understand various laws in DC circuits and be able to apply them to calculations. Understand the concept of electric power and electric energy and be able to calculate it. Understand Ohm's law and be able to calculate current, voltage, resistance, and combined resistance.
		5th	1. DC circuit (3) Kirchhoff's law	Understand various laws in DC circuits and be able to apply them to calculations. Understand Kirchhoff's laws and be able to apply them to DC circuit calculations.
		6th	1. DC circuit (3) Kirchhoff's law	Understand various laws in DC circuits and be able to apply them to calculations. Understand Kirchhoff's laws and be able to apply them to DC circuit calculations.
		7th	1. DC circuit (3) Kirchhoff's law	Understand various laws in DC circuits and be able to apply them to calculations. Understand Kirchhoff's laws and be able to apply them to DC circuit calculations.
		8th	[First semester midterm exam]	Check your understanding of the lesson content up to the mid-term exam of the first semester.
	2nd Quarter	9th	DC circuit (4) Superposition principle	Understand various laws in DC circuits and be able to apply them to calculations. Understand the principle of superposition and be able to apply it to DC circuit calculations.
		10th	1. DC circuit (4) Superposition principle	Understand various laws in DC circuits and be able to apply them to calculations. Understand the principle of superposition and be able to apply it to DC circuit calculations.
		11th	1. DC circuit (5) Thevenin's theorem	Understand various laws in DC circuits and be able to apply them to calculations. Understand Thevenin's theorem and be able to apply it to DC circuit calculations.
		12th	1. DC circuit (5) Thevenin's theorem	Understand various laws in DC circuits and be able to apply them to calculations. Understand Thevenin's theorem and be able to apply it to DC circuit calculations.
		13th	1. DC circuit (5) Thevenin's theorem	Understand various laws in DC circuits and be able to apply them to calculations. Understand Thevenin's theorem and be able to apply it to DC circuit calculations.
		14th	1. DC circuit (6) Millman's theorem	Understand various laws in DC circuits and be able to apply them to calculations. Understand Millman's theorem and be able to apply it to DC circuit calculations.
		15th	1. DC circuit (6) Millman's theorem	Understand various laws in DC circuits and be able to apply them to calculations. Understand Millman's theorem and be able to apply it to DC circuit calculations.
		16th	[First semester final exam] [Return of answers]	Check your understanding of the lesson content up to the final exam of the first semester.
2nd Semeste r	3rd Quarter	1st	Fundamentals of AC circuits (1) Trigonometric functions	Be able to explain the concepts of trigonometric functions, vectors, and complex numbers necessary to express sinusoidal alternating current. Able to explain the trigonometric functions and
				their graphs necessary to express alternating current.
		2nd	2. Fundamentals of AC circuits (1) Trigonometric functions	Able to explain the concepts of trigonometric functions, vectors, and complex numbers necessary to express sinusoidal alternating current. Be able to explain the trigonometric functions and their graphs necessary to express alternating
		3rd	2. Fundamentals of AC circuits (2) Representation and calculation methods of complex numbers	Able to explain the concepts of trigonometric functions, vectors, and complex numbers necessary to express sinusoidal alternating current. Understand the complex numbers necessary to express alternating current and be able to perform calculations.

	4th		C circuits (2) Representatior ods of complex numbers	Able to explain the concepts of trigonometric functions, vectors, and complex numbers necessary to express sinusoidal alternating current. Understand the complex numbers necessary to express alternating current and be able to perform calculations.			
	5th	2. Fundamentals of A and calculation metho	C circuits (2) Representatior ods of complex numbers	Able to explain the cond functions, vectors, and processary to express size	complex numbers nusoidal alternating numbers necessary to		
	6th	3. Complex number r AC (1) Generation of force	epresentation of sine wave sine wave AC electromotive	Able to explain the correspondence between sine wave alternating current and complex numbers, frequency, phase, effective value, etc. Able to explain the principle of generating sine wave AC electromotive force.			
	7th		epresentation of sine wave sine wave AC electromotive	Able to explain the correspondence between sine wave alternating current and complex numbers, frequency, phase, effective value, etc. Able to explain the principle of generating sine wave AC electromotive force.			
	8th	[Second semester mi	dterm exam]	Check your understandi up to the mid-term exa	ng of the lesson content n of the second semester.		
	9th		epresentation of sine wave ber representation of AC	Able to explain the correspondence between sine wave alternating current and complex numbers, frequency, phase, effective value, etc. AC voltage and current can be expressed using complex numbers.			
	10th		epresentation of sine wave ber representation of AC	Able to explain the correspondence between sine wave alternating current and complex numbers, frequency, phase, effective value, etc. AC voltage and current can be expressed using complex numbers.			
	11th	4. R, L, C AC circuit (1) R, L, C element	Able to calculate simple sine wave AC circuits. Able to explain the relationship between sinusoidal AC voltage and current in R, L, and C elements.			
4th Quarter	12th	4. R, L, C AC circuit (1) R, L, C element	Able to calculate simple sine wave AC circuits. Able to explain the relationship between sinusoidal AC voltage and current in R, L, and C elements.			
	13th	4. R, L, C AC circuit (2) Series circuit/impedance	Able to calculate simple sine wave AC circuits. Understand the impedance of series-connected circuits and be able to calculate current and voltage.			
	14th	4. R, L, C AC circuit (2) Series circuit/impedance	Able to calculate simple sine wave AC circuits. Understand the impedance of series-connected circuits and be able to calculate current and voltage.			
	15th	4. R, L, C AC circuit (2) Series circuit/impedance	Able to calculate simple sine wave AC circuits. Understand the impedance of series-connected circuits and be able to calculate current and voltage.			
	16th	[Second semester fine [Return of answers]	al exam]	Check your understandi	Check your understanding of the lesson content		
Evaluation Meth	od ar	d Weight (%)					
		Examination	Confirmation test	Report/Assignment	Total		
Subtotal		65		25	100		
Basic Proficiency		30		10	45		
Specialized Proficien	су	35	5	15	55		

Cross Area Proficiency