llege	Year	2021			Course Title		
on							
Course Information Course Code 0059			Course Category		General	General / Compulsory	
Lecture			Credits		School Credit: 1		
Technology	Communicatio	n and	Student Grade		3rd		
Second Sem	ester		Classes per V	Week	eek 2		
Textbook : A. Kinbara et al., "Senmonkiso Library Netsurikigaku Jirei de Wakaru Kanngaekata to Tsuk (Jikkyo Shuppan).Reference book : M. Matsushita, "Lecture on Physics Thermodynamics" (Shokabo).					nngaekata to Tsukaikata" mics" (Shokabo).		
Instructor SAEKI Fumihiro,SEKI Ichiro Course Objectives							
	eat and energ	y, and understan	d roles of heat	t in nat	ure and en	gineering].
first law of th properties of second law o	ermodynamic ideal gas, and f thermodyna	s, and calculate e d calculate heat, v mics, and explain	nergy exchan vork, and qua	ge in sl ntitv of	state in sta	ate chano	ge. nd heat engines.
		Good		Accept	table		Not acceptable
concept thermoo definitio properti physical Express using sy mathem	s of lynamics and ns, units, and es of related quantities. them accurat 'mbols and atical	concepts of thermodyna definitions, u ely properties of	mics and the units, and f related	definit physic related	ions and ur al quantitie d to	S	Has not reached the level described in the columns on the left.
calculate exchanges changes consiste of the fi	e energy je in various s s using a nt representa rst law of	tate exchange in changes usir	various state	e Calculate energy exchange using the first law of thermodynamics.		he first namics.	Has not reached the level described in the columns on the left.
properti and der	es of ideal gas	s, exchange an ons state using e	id quantity of equations for	state i	ising the ea	nuation	Has not reached the level described in the columns on the left.
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and der	ve its therma	efficiency of	general and	therm	al efficiency		Has not reached the level described in the columns on the left.
nent Objec	tives						
General or Specialized : General Field of learning : Common and basic natural science Foundational academic disciplines : Physics, Mechanical engineering/Thermal engineering Relationship with Educational Objectives : This class is equivalent to "(2) Acquire basic science and technical knowledge". Relationship with JABEE programs : The main goal of learning / education in this class is "(A)".							
Course outline : This course corresponds to the study of basic science and aims to cultivate scientific thinking. The conversion of heat and work, and changes in the state of matter are explained, taking into account familiar examples and their relation to engineering technology.							
Course method : The class will be taught mainly on the board, with careful explanations of basic concepts as much as possible. This is a course offered only in the second semester. Grade evaluation method : Exams (80%) + Homework (20%). The grades of the two regular examinations will be evaluated equally. Textbooks and notebooks are not allowed in the exam. Students whose grades are are below 60 points may be required to take a retest. The method of re-evaluation of grades by retest will be explained separately.							
	0059 Lecture Department Technology (Informations Second Sem Textbook : A (Jikkyo Shup SAEKI Fumil S oowledge of h c concepts of first law of th properties of second law o ermal efficien Excellen Underst Concept thermood definitio properti physical Express using sy mathem expressi Accurate calculate consiste of the fin thermood definitio properti physical Express using sy mathem expressi Accurate calculate exchanges consiste of the fin thermood definitio properti and deri for state Underst law of the fin thermood changes consiste of the fin thermood for state Underst properti and deri for state Course outlin This class is Relationship The main go Course outlin This course of hear and deri for state Course outlin This course outlin This course outlin This course outlin This course outlin This is a cou Grade evalue Exams (80% The grades of Students wh	On 0059 Lecture Department of Integrated Technology Communication Informations System Prog Second Semester Textbook : A. 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		Student	utions on the enrollment : nts must take this class (no more than one-third of the required number of class hours missed) in order nplete the 3rd year course.						
Notice		Thermo It is des As prepa calculus	Course advice : Thermodynamics is one of the most important subjects in natural science and engineering. It is desirable to understand the contents of the basic subjects listed below. As preparatory study to be done in advance, review the contents of mechanics and differential and integral calculus you have already studied.						
		and Inte	ional subjects: Physics I (1st year) gral II (3rd) subjects:Mechanics I, II, III (3rd y	d), Differential and Integral I (2nd), Differential					
	Attendance advice : It is important to understand by building up knowledge rather than by memorizing. Deepen your understanding by doing your homework actively. Late arrivals and early departures will be explained in the initial guidance.								
Charact	Late arrivals and early departures will be explained in the initial guidance. Characteristics of Class / Division in Learning								
	Active Learning Active Learning Active Learning Active Learning Active Learning Active Learning Instructor Professional								
	5	ete s	ubjects			Experienced			
Course									
			Theme		Goals				
2nd Semeste r	3rd Quarter	1st	Guidance Basic concepts of thermodynamics and heat)	(temperature	Explain the relationship between thermal motions of atoms and molecules and absolute temperatures.				
		2nd	Basic concepts of thermodynamics state, quantity depending on a proc		Explain that the state reaches thermal equilibrium by heat transmission as time passes. Perform calculations using heat capacity and specific heat of objects. Write a formula representing the law of conservation of heat then calculate heat capacity and specific heat.				
		3rd	The first law of thermodynamics (e conservation, internal energy)	nergy	Explain the internal energy of gas. Explain the first law of thermodynamics. Explain that energy takes various forms and can be converted between each form, showing specific examples.				
		4th	The first law of thermodynamics (h specific heat capacity, enthalpy)	eat capacity,	Calculate the enthalpy of closed system. Explain the relationship between specific heat at constant volume, specific heat at constant pressure, specific heat ratio and gas constant. Explain the relationship between the variation and temperature of internal energy and enthalpy.				
		5th	Properties of ideal gas (equation of heat capacity)	state, specific	Perform calculations relating to pressure, temperature and volume of gas using Boyle- Charles' law and the equation of state for the ideal gas.				
		6th	Quasi-static process of ideal gas (is isochoric change)	obaric change,	Explain isochoric and isobaric changes of ideal gas. Calculate physical properties in isochoric and isobaric changes using the equation of state of ideal gas.				
		7th	Quasi-static process of ideal gas (is change)	othermal	Explain isothermal change of ideal gas. Calculate physical properties in isothermal change using the equation of state of ideal gas.				
		8th	2nd semester mid-term exam						
	4th Quarter	9th	Return and commentary of exam a	nswers					
		10th	Quasi-static process of ideal gas (re adiabatic change)	eversible	Explain reversible adiabatic change of ideal gas. Calculate physical properties in reversible adiabatic change using the equation of state of ideal gas.				
		11th	Mixture of ideal gas(Dalton's law, q state)	uantity of	Explain the Dalton's law. Calculate quantities of state of a gas mixture.				
		12th	icroscopic model of ideal gas (motion of gas		Explain the relationship between thermal motions				
		13th	he second law of thermodynamics (irreversible rocess, heat engine, thermal efficiency)		of molecules and properties of ideal gas. Explain that work performed by kinetic friction force generally turns into heat. Show specific examples of irreversible changes. Perform calculations relating to thermal efficiency of heat engines.				
		14th	ne second law of thermodynamics (Carnot cycle)		Understand the meaning of a cycle, and calculate the thermal efficiency of a thermal engine. Understand the change in state of the Carnot cycle and calculate thermal efficiency.				
		15th	(2nd semester final exam)						
16th Return and commentary of exam answers									
Evaluation Method and Weight (%)									
Subtotal			Examination 80	Report 20	Total 100				
Jubiolai			00	20		100			

Basic Proficiency	80	20	100
Specialized Proficiency	0	0	0
Cross Area Proficiency	0	0	0