Tsuyama College	Year	2022	Course Title	Energy and Environmental Engineering

Course Information

Course Code	0120	Course Category	Specialized / Elective
Class Format	Lecture	Credits	Academic Credit: 2
Department	Department of Integrated Science and Technology Communication and Informations System Program	Student Grade	5th
Term	Year-round	Classes per Week	1
Textbook and/or Teaching Materials	Textbook: Kozo Yamazaki, Science of Energy and Environment (Kyoritsu Shuppan)Reference book: Takehisa Abe and others, "Energy and Environment in the Future" (Kyoritsu Shuppan)Takeki Sakakibara, "Electric Energy Basics" (Ohm Co., Ltd.) etc.		
Instructor	NAKAMURA Shigeyuki		

Course Objectives

Learning purposes : The purpose of this course is to understand that the contents of environmental and energy engineering are made up of various complex technologies that are deeply related to each other across a wide range of specialized fields, and to understand the importance of future energy and global environmental issues.

Course Objectives :
1. To be able to explain the fundamentals of environmental and energy engineering (e.g., fundamentals of energy, environment, people, resources, and economy).
2. To be able to explain the applications of environmental energy engineering (e.g., various types of energy (mechanical, thermal, electromagnetic, light and solar, chemical and fossil fuel, biological and biomass, nuclear and nuclear fuel) and their effective utilization).
3. To be able to explain the environmental applications of environmental energy engineering (e.g., global warming, environmental conservation) and future energy and environment.

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	To be able to explain this item with reference to a reference book. Able to perform quantitative analysis.	To be able to explain about 80% of this item with reference to a reference book.	Able to explain about 60% of this item with reference to a reference book.	Not reached left.
Achievement 2	To be able to explain this item with reference to a reference book. Able to perform quantitative analysis.	To be able to explain about 81% of this item with reference to a reference book.	Able to explain about 61% of this item with reference to a reference book.	Not reached left.
Achievement 3	To be able to explain this item with reference to a reference book. Able to perform quantitative analysis.	To be able to explain about 82% of this item with reference to a reference book.	Able to explain about 62% of this item with reference to a reference book.	Not reached left.

Assigned Department Objectives

Teaching Method

Outline	Specialized Field of learning: Environmental engineering Foundational academic disciplines: Engineering/basics of engineering Relationship with Educational Objectives : This class is equivalent to (2) Acquire basic science and techinical knowledge Outline: This course provides a broad overview of the fundamentals, applications, and future prospects of energy science and environmental science. Students will learn about the current status and issues of various energy generation and utilization technologies, and develop the ability to find and solve problems from the perspective of the environment and energy.
Style	Method: The second semester is 16 weeks long, 2 credit hours per week (90 minutes). Students will be divided into groups of several students. They will prepare materials based on the theme and content of each week and each student will make a presentation based on the materials. Study the textbook and your own to prepare for your presentation. Grading system: Presentation materials (40%) and quizzes (10%) will count for 50% of the final grade, and the results of the regular examinations will count for 50%. The overall grade is the average of the midterm and final grades. If a student is found to have insufficient understanding of a subject based on the results of the final exam, the student will be given a make-up lecture on that part of the subject and may be required to take a retest. The result of the retest will be included in the regular exam result with a maximum of 60 points. Students are allowed to bring their own textbooks and other materials to the exam.
Notice	"Course Note: Since this course covers a very wide range of fields, you may have to write a report on areas that cannot be covered in class alone. Students are encouraged to study the subject thoroughly. Basic subjects: Introduction to Electromagnetism (3rd year), Introduction to Thermodynamics (3), Power Engineering (4), Electric Power Transmission and Distribution (4) Related subjects: electrical applications and environment (4 years), environmental science (5) Advice: Take sufficient time to prepare the preliminary materials. This course requires a comprehensive knowledge of the subject matter covered in the past and students should try to align the content of the course with the knowledge learned in the past. Attendance will be taken, and each hour will be considered late from the beginning of the class to 20 minutes. If you are later than 20 minutes late, you will be considered absent from the class.

Characteristics of Class / Division in Learning			
☐ Active Learning	☐ Aided by ICT	☐ Applicable to Remote Class	☐ Instructor Professionally Experienced

Elective must complete subjects

Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	Guidance, energy basics, environmental basics	Understanding of energy and environmental concepts
		2nd	Human resources, resources, economy, dynamics	energy resources, relationship with the economy
		3rd	Hydropower, wind and tidal power	Renewable energy (hydropower, wind power, tidal power)
		4th	Thermal energy and geothermal and solar thermal	Various thermal energy
		5th	Electromagnetic energy and electricity	Electromagnetic energy
		6th	Light Energy and Sunlight	Energy distribution of sunlight
		7th	Chemical energy and fossil fuels	Chemical energy and fossil fuels
		8th	Late midterm exam	
	2nd Quarter	9th	Return and Answer Commentary for Late Midterm Exam, Bioenergetics	Bioenergetics
		10th	Nuclear Power and Nuclear Energy	How Nuclear Power Works
		11th	Effective use of energy	nergy conservation and efficiency improvement
		12th	Global Warming	Basic Knowledge about Global Warming
		13th	A variety of environmental conservation	Basic knowledge of environmental conservation
		14th	Future Energy and Future Environment	Basic knowledge of Future Energy and Future Environment
		15th	Late-Term Examination	
		16th	End-of-term exam returns and answer explanations	Future Energy and Future Environment Future Energy
2nd Semester	3rd Quarter	1st		
		2nd		
		3rd		
		4th		
		5th		
		6th		
		7th		
		8th		
	4th Quarter	9th		
		10th		
		11th		
		12th		
		13th		
		14th		
		15th		
		16th		

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Mini test	Report	Total
Subtotal	50	0	0	0	0	0	50	100
Basic Proficiency	0	0	0	0	0	0	0	0
Specialized Proficiency	50	0	0	0	0	0	50	100
Cross Area Proficiency	0	0	0	0	0	0	0	0