Tsuyama College	Year	2020	Course Title	Environmental Sciences

Course Information

Course Code	0125	Course Category	General / Compulsory
Class Format	Lecture	Credits	School Credit: 1
Department	Department of Integrated Science and Technology Communication and Informations System Program	Student Grade	5th
Term	First Semester	Classes per Week	2
Textbook and/or Teaching Materials	Textbooks : Ichiro Ishii, "Environmental Engineering 3rd Edition" (Morikita Publishing)		
Instructor	YAMAGUCHI Daizo,KOBAYASHI Toshiro,HARADA Kanji,YAGI Hideyuki		

Course Objectives

Learning purposes :
The goal is to acquire basic knowledge about the relationship between the environment and chemical materials and the future direction of environmental science.

Course Objectives :
1. Explain Japan's pollution and explain the measures to prevent environmental pollution.
2. Explain the mechanism of various environmental problems surrounding the earth.
3. Explain energy and resource problems, and explain countermeasures.
4. Explain technologies for environmental improvement and environmental conservation, and explain countermeasures.

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	Explain pollution in Japan and explain measures to prevent pollution and environmental pollution.	Explain Japan's pollution and explain pollution prevention measures.	Can explain Japan's pollution	Not reached the left
Achievement 2	Explain the mechanism of various environmental problems surrounding the earth.	Explain various environmental problems surrounding the earth.	Explain environmental issues.	Not reached the left
Achievement 3	Explain energy and resource problems, and explain countermeasures.	Explain energy and resource issues.	Explain the energy problem.	It has not reached the left.
Achievement 4	Explain technologies for environmental improvement and environmental conservation, and explain countermeasures. Explain technologies for environmental improvement and environmental conservation. Explain the technology for environmental protection. It has not reached the left.	Explain technologies for environmental improvement and environmental conservation.	Explain the technology for environmental protection. It has not reached the left.	It has not reached the left.

Assigned Department Objectives

Teaching Method

Outline	General or Specialized : General Field of learning : Natural science common / basic (general subject) Required, Elective, etc. : Must complete subjects Foundational academic disciplines : Environmental conservation measure and related field Relationship with Educational Objectives : This class is equivalent to "(2) Acquire basic science and technical knowledge". Relationship with JABEE programs : The main goals of learning / education in this class is " A-1", also "G-2" and "B-1" are involved. Course outline : To develop awareness as an engineer by learning about the history and current situation of environmental problems and energy problems, which are problems in Japan and around the world, and by giving lectures on technologies for environmental improvement and environmental conservation. It is a discipline that corresponds to basic science and cultivates scientific thinking.
Style	Course method : Classes will be centered on PowerPoint, various media, and board writing. Based on the assignment reports (usually 10 times) related to current events, the lessons will be advanced while allocating a lot of time to discussions (including presentations) between teachers and students. This will improve the understanding of technical methods and foster students' awareness of environmental issues as engineers. Grade evaluation method : The presentation (presentation content 20%, slide content 20%, attitude toward discussion 20%) 60%, report content 40% will be evaluated comprehensively.

Notice	Precautions on the enrollment This courses are required to complete the academic year. (Students must take this class (no more than one-third of the required number of class hours missed). This is a class that requires study outside of class hours. Classes are offered for 15 credit hours per credit, but 15 credit hours of study are required in addition to this. Follow the instructions of your instructor for these studies. Course advice : It is important to pay attention to TV and newspaper reports on a regular basis. Foundational subjects : Biology I (1st year), Chemistry I (2nd), Chemistry II (2nd), Applied Chemistry (4th), Applied Biology (4th), etc. Related subjects : Mechanical design method I (3rd year), II (4th), Thermodynamics (4th), Fluid engineering (5th), etc. Attendance advice : This subject is related to environmental education and the development of core human resource for nuclear engineering. It is important to be always interested in the activities of the industrial world and energy issues from the environmental issues that are familiar to us, and we look forward to demonstrating not only awareness but also action. "Ear studies in chat" is useful in society. If you are late for 15 minutes, you will be considered absent.

Course Plan

			Theme	Goals
2nd Semester	3rd Quarter	1st	Guidance / General (Learning content outside class hours: Noise as pollution) Noise as pollution	⑤ Be able to explain the appropriate actions to be taken based on the ethics of engineers, in relation to the technical field in which they specialize, based on the specific problems of modern society. ⑥Aware of the social background and importance of engineer ethics. ⑦ Explain the roles and responsibilities of engineers in society. ⑧ Explain the impact of advances in information technology on society, the Personal Information Protection Law, copyrights, and other laws. ⑨ Explain the relationship between information and communication technology and ethics, which are at the core of the advanced information and communication network society.
		2nd	Noise (learning content outside class hours: noise countermeasures)	Noise countermeasures ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		3rd	Infrasound (Learning content outside class hours: Infrasound measures)	About measures against ultra-low frequency sound ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		4th	Pollution vibration (learning content outside class hours: about pollution vibration countermeasures)	About pollution vibration countermeasures ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		5th	Water pollution (learning content outside class hours: water pollution countermeasures)	About water pollution measures ② Explain the bioaccumulation of harmful substances. ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		6th	Air pollution (learning content outside class hours: about air pollution countermeasures)	About air pollution measures ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		7th	Radioactive contamination (learning content outside class hours: measures against radioactive contamination of water, air, and soil)	About measures against radioactive contamination of water, air and soil ⑤ Be able to explain the appropriate actions to be taken based on the ethics of engineers, in relation to the technical field in which they specialize, based on the specific problems of modern society.
		8th	1st semester mid-term exam	
	4th Quarter	9th	Return and commentary of exam answers Ground subsidence (learning content outside class hours: ground subsidence countermeasures)	About ground subsidence measures ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		10th	Stink (Learning content outside class hours: Automobile exhaust gas and its countermeasures (catalyst))	About automobile exhaust gas and its countermeasures (catalyst) ④ Be able to explain basic responsibilities regarding the behavior of engineers, such as accountability, product liability, and risk management. ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.

		11th	Soil pollution (learning content outside class hours: about soil pollution countermeasures)	About soil pollution countermeasures ④ Be able to explain basic responsibilities regarding the behavior of engineers, such as accountability, product liability, and risk management. ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		12th	Waste / Natural environment (Learning content outside class hours: Waste disposal technology)	About waste treatment technology ④Be able to explain basic responsibilities regarding the behavior of engineers, such as accountability, product liability, and risk management. ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		13th	Destruction of nature / global environment (learning content outside class hours: global warming issues and energy / resources)	About global warming problem and energy / resources ① Explain the decrease in tropical forests and the loss of biodiversity. ③ Explain the problems, causes and countermeasures of global warming. ⑫ Explain what behavior is appropriate for an engineer in the international community ⑬ Be able to recognize the problems facing rural areas such as depopulation and declining birthrate, and explain the role that science and technology can play in contributing to the local community. ⑮ As a person who aims to be an engineer, he respects the culture and customs of other countries and understands the importance of observing the relevant laws and regulations applicable to each country and region.
		14th	Environmental impact assessment method (learning content outside class hours: about environmental impact assessment method)	About environmental impact assessment method ⑩ Understand the basic matters regarding the current state of environmental problems and explain the impact of science and technology on the global environment and society. ⑪ Be able to explain what behavior is appropriate as an engineer in consideration of environmental issues. ⑭ Explain the social responsibility of engineers, observing social norms and laws, and the importance of legal compliance within a company.
		15th	(1st semester final exam)	
		16th	Return and commentary of exam answers Summary	⑤Be able to explain the appropriate actions to be taken based on the ethics of engineers, in relation to the technical field in which they specialize, based on the specific problems of modern society. ⑥We are aware of the social background and importance of engineer ethics. ⑦ Explain the roles and responsibilities of engineers in society. ⑯ Explain what you should consider from your own field of expertise in order to realize sustainable development where all people can live with peace of mind in the future. ⑰ As a person who aims to be an engineer, we recognize the importance of working together on issues such as building peace, promoting cross-cultural understanding, maintaining natural resources, and preventing disasters. ⑱ Explain the roles and responsibilities of engineers based on the impact of science and technology on society. ⑲ Explain the mission and importance of engineers through the appearance of scientists and engineers contributing to the development of technology while overcoming various difficulties.

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Slide contents	Total
Subtotal	0	20	0	20	40	0	20	100
Basic Proficiency	0	20	0	20	40	0	20	100
Specialized Proficiency	0	0	0	0	0	0	0	0
Cross Area Proficiency	0	0	0	0	0	0	0	0