Toyama College	Year	2022	Course Title	ECO Electric Power System

Course Information

Course Code	0041	Course Category	Specialized / Elective
Class Format	Lecture	Credits	Academic Credit: 2
Department	ECOdesign Engineering Course	Student Grade	Adv. 1st
Term	Second Semester	Classes per Week	2
Textbook and/or Teaching Materials	送電・配電（道上勉 著 ・ 電気学会）		
Instructor	Sato Keisuke		

Course Objectives

At the compiletion of this cource, students will be able to
1)Understand the configuration of the electric power system.
2)Understand the electrical and mechanical characteristics of the transmission and distribution lines.
3)Understand the outline of transmission and distribution lines.
4)Calculate fault currents during short / ground faults.

Rubric

	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Students can understand the composition of the electric power system.	Students understand the configuration of the electric power system and can calculate power transmission efficiency and supply reliability.	Students can not understand the composition of the electric power system.	Students can calculate the voltage drop, the transmission capacity, the slack of the electric cables and the strength of the steel tower with respect to the transmission and distribution lines.
Students can understand the electrical and mechanical characteristics of the transmission and distribution lines	Students can understand the electrical and mechanical characteristics of the transmission and distribution lines	Students can not understand the electrical and mechanical characteristics of the transmission and distribution lines	Students can understand and design the characteristics of imaginary and underground transmission lines.
Students can understand the outline of transmission and distribution lines.	Students can understand the characteristics of fictitious and underground transmission lines	Students can not understand the characteristics of fictitious and underground transmission lines	Students can calculate fault current during short / ground fault using the unit method · percent method

Assigned Department Objectives

学習・教育到達度目標 A-6
JABEE 1(2)(d)(1) JABEE 1(2)(e)

Teaching Method

Outline	For transmission and distribution cables indispensable for electric power transport, acquire specialized technologies ranging from electrical characteristics and mechanical characteristics of overhead wire to actual design, construction and maintenance.
Style	Lecture and exercise
Notice	Students are required to know Kirchhoff's law, supervising principle, electric circuit of Thevenin, etc.

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	Power system and power transmission / distribution technology	Understand the outline of power transmission lines and distribution lines
		2nd	Electrical characteristics of transmission and distribution lines(1)	understand the line constant and voltage drop
		3rd	Electrical characteristics of transmission and distribution lines(2)	understand transmission capacity and stability.
		4th	Mechanical properties of transmission and distribution lines	understand the concept of strength calculation of supports
		5th	Overhead power transmission line	understand the supporting equipment, the components of the insulator, etc. and their roles
		6th	Overhead power transmission line	understand wire vibration, corona, TV obstacles and countermeasures
		7th	Underground transmission line	understand the characteristics of the underground transmission line (difference with overhead transmission line)
		8th	Distribution line	understand the characteristics of the electric method of the distribution line
	4th Quarter	9th	Intermediate test	
		10th	Short circuit · Ground fault calculation(1)	understand the concept of unit method and percentage method
		11th	Short circuit · Ground fault calculation(2)	understand fault calculation method using simplified method
		12th	Neutral grounding method, inductive fault, abnormal voltage(1)	understand the objectives and types of neutral grounding system

		13th	Neutral grounding method, inductive fault, abnormal voltage(2)	understand the objectives and types of neutral grounding system
		14th	Protection relay device for transmission and distribution cable	understand protective relay devices that protect power systems
		15th	term-end exam	
		16th	Answer to the final exam, questionnaire	

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	90	0	0	0	0	10	100
Basic Ability	0	0	0	0	0	0	0
Technical Ability	90	0	0	0	0	10	100
Interdisciplinary Ability	0	0	0	0	0	0	0