Tsuyama College	Year	2024	Course Title	Power Electronics

Course Information

Course Code	0028	Course Category	Specialized / Elective
Class Format	Lecture	Credits	Academic Credit: 2
Department	Advanced Electronics and Information System Engineering Course	Student Grade	Adv. 2nd
Term	Second Semester	Classes per Week	2
Textbook and/or Teaching Materials	Textbook: Electric Energy (Mohamed A. El-Sharkawi, CRC Press)		
Instructor	OKE Shinichiro		

Course Objectives

Learning purposes :
Understand the principles and features of power systems, power devices, power conversion circuits, and powe system control.

Course Objectives
1. To be able to explain industrial application areas and fields of use of power control.
2. To be able to explain the characteristics of the various systems that make up the electric power system.
2. To be able to explain types, structures, and characteristics of power devices and their control methods.
3. To be able to explain the concept and types of power conversion circuits and their operating principles.

Rubric

	Excellent	Good	Acceptable	Not acceptable
Achievement 1	Explain the industrial application areas and fields of use of power control.	Briefly explain the industrial application areas and fields of use of power control.	Explain the fundamentals of the industrial application areas and fields of use of power control	It has not reached the left.
Achievement 2	Explain the characteristics of the various systems that make up the electric power system.	Briefly explain the characteristics of the various systems that make up the electric power system.	Explain the basic characteristics of the various systems that make up the electric power system.	It has not reached the left.
Achievement 3	Explain types, structures, features, and control methods of power devices.	Briefly explain the types, structures, and characteristics of power devices and their control schemes.	Explain basic details of types, structures, and features of power devices and their control methods.	It has not reached the left.
Achievement 3	Explain the concept and types of power conversion circuits and their operating principles.	Briefly explain the concept and types of power conversion circuits and their operating principles	Explain the basic concepts and types of power conversion circuits and their operating principles	It has not reached the left.

Assigned Department Objectives

Teaching Method

Outline	General or Specialized : Specialized Field of learning : Electrical / Information / Control Foundational academic disciplines : Engineering / Electrical and Electronic Engineering / Power Engineering / Electrical Equipment Engineering Relationship with Educational Objectives : This class is equivalent to a learning goal in advance course "(2) Acquire knowledge in specialized technical fields related to electricity / electronics, information / control, and acquire the ability to utilize it for the design / policy / operation of machines and systems." Relationship with JABEE programs : The main goals of learning / education in this class is "(B) Deepening basic knowledge about technology, B-1 : To be able to acquire and explain the knowledge of specialized technical fields related to "electricity / electronics" and "information / control". " Course outline Understand the characteristics, basic structure, and operating principles of power system technology and power electronics technology, which are widely used in industry. Learn the basics of application techniques for various applications. Use English texts to improve technical English reading comprehension.
Style	Course method : Classes are conducted in the form of each student presenting the shared part. Report and exercise as appropriate to deepen understanding. Grade evaluation method : Grading will be based on the presentation (60%) and report/exercises (40%).

Notice	Precautions on the enrollment : This is a class that requires study outside of class hours. A total of 45 hours of study is required per credit, including both class time and study outside class time. Follow the instructions of the instructor regarding study outside of class hours. Course advice : As preparatory study, students should review the contents of electric circuits, electronics, power generation engineering, power transmission and distribution engineering, and power electronics. It is also important to understand the operation of inductors and capacitors, which are the basic elements of electric circuits. Foundational subjects : Electrical and Electronic Circuits (2nd Year), Electronic Circuit I, II (E 3rd, 4th), Electrical Circuit (C 4th), Engineering of Electric Power Generation (E 4th), Control Engineering (C 4th) Related subjects : Electric Power Transmission and Distribution (E 4th Year), Electrical Circuits System (C 4th), Power Electronics (E 5th), Electrical and Electronic Equipment (1st in advanced course) Attendance advice : Rather than the passive attitude of listening to the lecture, the lesson is regarded as a place to announce the results of the preparation and exchange opinions with teachers and other students, or as a place to ask questions and comments to the presenter from a critical point of view. Students who are not present when attendance is checked at the beginning of class are considered tardy, and those who enter class after half of the credit hours have passed from the start of class are considered absent.

Characteristics of Class / Division in Learning

☑ Active Learning	☑ Aided by ICT	☑ Applicable to Remote Class	☐ Instructor Professionally Experienced

Elective subjects

Course Plan

			Theme	Goals
2nd Semester	3rd Quarter	1st	Guidance	To be able to explain the outline of the class and how to conduct it. Outside of class time: To be able to prepare for class.
		2nd	History of power systems	To be able to explain the history of power systems. Outside of class: To be able to prepare materials to explain the history of power systems.
		3rd	Futures of power systems	To be able to explain the futures of power systems. Outside of class: To be able to prepare materials to explain the futures of power systems
		4th	Components of power sytems (1) Transmission systems	To be able to explain the transmission systems. Outside of class: To be able to prepare materials explaining the transmission systems.
		5th	Components of power sytems (2) Distribution systems	To be able to explain the distribution systems. Outside of class: To be able to prepare materials to explainthe distribution systems.
		6th	Power plants (1) Hydro power and thermal power	To be able to explain the hydro power and the thermal power. Outside of class: To be able to prepare materials explaining the hydro power and the thermal power.
		7th	Power plants (2) Nuclear power	To be able to explain the nuclear power. Outside of class: To be able to prepare materials to explain the nuclear power.
		8th	Mid-term exam	
	4th Quarter	9th	Renewable energy (1) Solar energy	To be able to explain the solar energy. Outside of class: To be able to prepare a document to explain the solar energy.
		10th	Renewable energy (2) Wind energy	To be able to explain the wind energy. Outside of class: To be able to prepare materials to explain the wind energy.
		11th	Power enectronics (1) Power devices	To be able to explain the power devices. Outside of class: To be able to prepare materials to explain the power devices.
		12th	Power enectronics (2) Power conversion circuit	To be able to explain the power conversion circuit. Outside of class: To be able to prepare a document explaining the power conversion circuit.
		13th	Power flow control	To be able to explain the power flow control. Outside of class: To be able to prepare a document explaining the power flow control.
		14th	Blackouts of power systems	To be able to explain the blackouts of power systems. Outside of class: To be able to prepare a document to explain the blackouts of power systems.
		15th	Final exam	
		16th		

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	0	60	0	0	40	0	100
Basic Proficiency	0	20	0	0	0	0	20
Specialized Proficiency	0	20	0	0	40	0	60
Cross Area Proficiency	0	20	0	0	0	0	20