

Energy Engineering

Basic Course Information			
Course Number	1105142	Subject Category	Elective-III
Class Format	Lecture	Credit Type and Number of Credits	1
Department	Mechatronics	Student Category	Year 5
Period of Study	Semester 2	Classes per Week	1
Required Materials			
Instructor	Shrii Takashita	Flaoun Naimonasset	

Course Objective
 Through this course, students will learn an overview of power generation and substation facilities, the structure of each power generation system including thermal power generation, and the energy resources required. Students will also learn about renewable energy sources such as wind and solar power. In addition, students will also learn about the environmental issues associated with various energy generation methods.

Evaluation/Unit	Minimal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Thermal, hydroelectric, and nuclear power generation systems and overviews	Understand and explain the principles and equipment of thermal, hydroelectric, and nuclear power generation	Understand and explain the principles and equipment of at least two of the following: hydroelectric, thermal, and nuclear power generation	Unable to understand and explain the principles and equipment of hydroelectric, thermal, and nuclear power generation
Mechanisms and overview of new energy generation	Understand and explain the principles and equipment for power generation using at least three types of new energy	Understand and explain the principles and equipment of power generation, using two or more types of new energy sources	Unable to understand and explain the principles and equipment of power generation using new energy sources
Environmental Issues Associated with Power Generation	Understand and explain the environmental problems associated with various energy generation methods	Explain the environmental problems associated with various energy generation methods, at least nuclear and thermal power generation	Unable to explain the environmental problems faced by various energy generation methods

Relationship with Learning Outcomes
M19 Ability to design, process and develop electrical and electronic systems for robotics/ mechatronic systems
E10 Ability to design, process and develop smart electrical power systems for sustainable development.
E10 Ability to design, process and operate infrastructure for energy management.

Teaching Method	
Outline:	This subject is about so-called classical control theory. As an element of this
Class Format:	Lecture and Exercise
Please Note:	All materials will be posted on Google classroom.

Course Plan				
Semester 2	Contents and Method of Course	Goals	Related MCO	
1st Week	Guidance, Outline of Generating and Transforming Facilities	Can explain overview of power generation system and the flow from the power plant to the consumer	V-C	B-76
2nd Week	Thermal power generation 1 Overview	Can explain overview of 4-alls and power generation systems used in thermal power generation	V-C	B-76
3rd Week	Thermal power generation 2 Thermal-mechanical energy conversion process	Can explain the processes and systems that convert heat to electrical energy	V-C	B-76
4th Week	Thermal power generation 3 Combined Cycle Power Generation and Thermal Efficiency	Can explain combined cycle power generation as a method of increasing power generation efficiency	V-C	B-76
5th Week	Holiday		V-C	B-76
6th Week	Hydro power generation 1 Overview	Can explain an overview of hydroelectric power generation	V-C	B-76
7th Week	Hydro power generation 2 Type of turbine and power output	Bernoulli's theorem can be explained and power output can be calculated	V-C	B-76
8th Week	Mock test and review for 1st half	Can solve mock test		
9th Week	Holiday			
10th Week	Midterm Exam	From Week 1 to Week 7		
11th Week	Nuclear power generation 1 Overview	Can explain an overview of nuclear power generation	V-C	B-77
12th Week	Nuclear power generation 2 Environmental Issues and Radioactive Waste Disposal	Can explain how radioactive waste is disposed of and the problems involved	V-C	B-76
13th Week	Solar power generation	Can explain an overview of solar power generation	V-C	B-78
14th Week	Wind turbine power generation	Can explain an overview of wind turbine power generation	V-C	B-78
15th Week	Other new power generation systems	Can explain principle for fuel cell, MHD power generation, geothermal electric power generation, etc.	V-C	B-76
16th Week	Energy environmental issues	Understand and explain the environmental issues faced by various energy generation methods	V-C	B-76
17th Week	Energy mix and situation in Thailand	Compare the ratio of energy produced by various power generation methods and explain the situation in Thailand		
18th Week	Mock test and review for 2nd half	Can solve mock test		
19th Week	Final Exam	From Week 11 to Week 17		
20th Week	Return the exam and review			

	Examination	Quiz	Mid-Examinations between students	Report	Portfolio	Other
Basic Ability	60			30		
Technical Ability	10			10		
Interdisciplinary Ability						