

<b>COURSE</b>	Name : Power Electronics
	Code : EE184611
	Credits : 3
	Semester : VI

### Description of Course

This course provides an overview of the role of electronic-based energy (power electronics) conversion in the electricity system.

### Learning Outcomes

#### KNOWLEDGE

(P02) Mastering the concepts, procedures and principles of engineering and realizing them in the form of procedures required for system analysis and design in electric power systems, regulatory systems, multimedia telecommunications, or electronics.

#### SPECIFIC SKILL

(KK01) Able to make formulation of engineering problems in electric power systems, regulatory systems, multimedia telecommunications, or electronics.

#### GENERAL SKILL

(KU11) Able to implement the principle of sustainability in developing knowledge

(KU12) Able to implement information and communication technology in the context of carrying out their work.

#### ATTITUDE

(S06) Working together and having social sensitivity and caring towards society and the environment

(S09) Demonstrate the attitude of being responsible for work in his area of expertise independently

(S12) Working together to make use of their maximum potential.

### Course Learning Outcomes

#### KNOWLEDGE

- Knowing the application and requirements of electronic-based energy conversion systems in the scope of electricity systems and society in general
- Knowing the energy conversion device and its main components

#### SPECIAL SKILL

- Able to design energy conversion systems
- Able to make technical analysis of energy conversion devices

#### KNOWLEDGE

1. Knowing in general the scope of use and the need for an electrical energy conversion system
2. Understanding the principles and characteristics of semiconductor switches

3. Understanding the transient characteristics of the circuit with resistor components, inductors, capacitors along with the breaker switch which is supplied with a dc or ac source voltage
4. Understanding the principles and characteristics of the 4 types of energy conversion devices:
  - from the ac system to dc
  - from the dc system to dc
  - from the dc system to ac
  - from the ac system to ac
5. Understanding the principles and characteristics of several devices used in industry: uninterruptible power supply, variable speed drives, active filters.

#### SKILLS

1. Able to explain the scope of use and the need for an energy conversion system
2. Able to explain the principle, characteristics, determine the type and capacity of the semiconductor switch in a circuit
3. Able to explain transient phenomena in a circuit with a breaker switch and an ac or dc voltage source
4. Able to explain principles, analyze, model, simulate, and calculate the magnitude of the main components of energy conversion system devices:
  - a. from the ac system to dc
  - b. from the dc system to dc
  - c. from the dc system to ac
  - d. from the ac system to ac
5. Able to explain work principles and analyze devices in industries such as uninterruptible power supply, variable speed drives, harmonic filters.

#### Main Subjects

1. Scope of the electricity system, needs and use of energy conversion devices
2. Semiconductor switch: diode, thyristor, transistor
3. A series of combinations R, L, C with a switch and a dc and ac voltage source
4. Convert circuit from:
  - AC to DC, wave ripples, level filters
  - dc to dc, wave ripples
  - DC to AC, harmonics, passive filters
  - AC to AC, topology
5. Uninterruptible power supply system, variable speed drive, harmonic filter.

#### Reference(s)

- [1] MochamadAshari, "DesainKonverterElektronikaDaya", PenerbitInformatika, Bandung, 2017
- [2] Muhammad H. Rashid, "Power Electronics Handbook Devices, Circuits, and Applications", Third Edition, 2011
- [3] Ned Mohan, "Power Electronics", John Willey and Sons, 2012

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**Prerequisite(s)**

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EE184306 Electronic Circuits

EE184303 Electromagnetics

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