

<b>COURSE</b>	Name	: Sensors and Actuators
	Code	: EE184543
	Credits	: 3
	Semester	: V

### Description of Course

This course studies the implementation of digital circuits and systems using programmable hardware components of FPGA, which also include design procedures using HDL (Hardware Description Language) such as VHDL or Verilog, and the use of EDA tools for designing. Implementation includes design of combinational circuits, sequential circuits, FSM, DSP, digital filter circuit, and microprocessor design.

### Learning Outcomes

#### Knowledge

(P03) Mastering the concepts and principles of design procedure in power systems, control systems, multimedia telecommunications, or electronics

#### Specific Skill

(KK03) Able to describe system design for problem solving in power systems, control systems, multimedia telecommunications, or electronics by concerning technical standards, performance aspect, reliability, ease of application, and assurance of sustainability

#### General Skill

(KU05) Able to take decisions appropriately in the context of problem solving in the area of expertise based on the results of information and data analysis.

#### Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

### Course Learning Outcomes

#### Knowledge

Mastering basic concept of sensors and actuators

#### Specific Skill

Able to calculate analyze parameters in sensors and actuators.

Able to design, engineer, and analyze sensors and actuators as needed.

#### General Skill

Able to analyze and take decisions in solving problems related to sensors and actuators.

#### Attitude

Demonstrating attitude of responsibility on work in his/her field of expertise independently.

### Main Subjects

1. Description of sensors, transducers and actuators.
2. Parameters and characteristics of sensors and actuators.
3. The working principle of voltage sensor, current and electric phases.

4. The working principle of position sensor, displacement, speed and acceleration.
5. The working principle of force, pressure and flow sensors.
6. The working principle of temperature sensor, humidity and pH.
7. The working principle of light intensity and radiation sensors.
8. Sensor manufacture technology.
9. Working principle of heater, solenoid and motor.
10. The working principle of the type of contactor, solid state switch and inverter.

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#### Reference(s)

- [1] Fraden, J. (2010). Handbook of modern sensors: physics, designs, and applications. New York, NY: Springer.
- [2] Morris, Alan S. (2006). Measurement and Instrumentation Principles. Elsevier, Butterworth Heinemann.

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#### Prerequisite(s)

EE184303 Electromagnetics  
EE184306 Electronic Circuits

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