Instrumentation System

2 units (selection)

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Target〉 General instrumentation system aims at the creation of machines that mimic the five human common senses. Many sensors have already been proposed and put to practical use to achieve this. This lecture, therefore, aims at the understanding of the indispensable basic instrumentation systems necessary to control a physical system.

Outline〉 The general flow of information measurement is the conversion of a physical state of an object using a sensor into an electric signal, feeding the data into a computer, and the conversion of the data into a form that man and the machine can easily understand. This lecture, simply explains the input interface into an analog circuit, the computer system used to measure the data and the outputs of various sensors made using physical or chemical phenomenon, that is, the technology used in processing the digital data while showing by concrete examples the technology that a machine can easily use to convert and understand the information.

Keyword〉 *Sensors*

Fundamental Lecture〉 "**Lecture and Exercise in Electric Circuits**"(1.0), "**Electronic Circuits**"(1.0), "**Microprocessors**"(1.0)

Relational Lecture〉 "**Electronic Circuits**"(0.5)

Requirement〉 To take this course, it is desirable to have finished the above courses

Notice〉 none

Goal〉 Understand basic information instrumentation technology and acquire the knowledge needed in the course "System design and experiment" to be taken in the 3rd year.

Schedule〉

1. Measurement basics
2. Optical and magnetic sensors
3. Pressure and temperature sensors
4. Proximity and ultrasonic sensors
5. Humidity and gas sensors
6. Operational amplifier and analog computing circuit
7. Analog-to-digital converter
8. Digital-to-analog converter
9. Analog filter
10. I/O interface
11. Digital measurement control system
12. Signal conversion
13. Electronic measuring instrument (indicating instrument and wavy display device)
14. Electronic measuring instrument (wavy, analytical device and recording equipment)
15. Question ₋ summary
16. Exam

Evaluation Criteria〉 Result: Attendance (10%) and reports and continuous assessment tests (50%), final exam (40%).

Textbook〉 Yoshiaki Tadokoro "Electronic measurement and control"

Reference〉 "Basics of sensor engineering" by Kouro Yamazaki

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=215979

Student〉 Able to be taken by night course student of same department

Contact〉

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Note〉 To pass this class and to fully understand each lecture, two hours each for preparation and review are necessary.