

Engineering Program

Specialization	Technology of remote industrial sensing and controlling
Course Number	20413141
Course Title	Signal conditioning circuits
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:

This course covers the basic of analog and digital signal conditioning circuits. It includes voltage divider, bridges, filters, operational amplifier and their applications, ADCs and DACs. In addition to that it covers the practical consideration design.

Course Objectives:

Upon the completion of the course, the student will be able to:

- 1- To be familiar with analog conditioning circuits
- 2- To be familiar with digital conditioning circuits
- 2- Explain the principle of operation OP Amp
- 3- Study the op Amp circuits and their applications.
- 4- Explain the operation of ADC and DAC

Detailed Course Description:

Chapter No.	Content	Textbook	Time Needed
1	Analog signal conditioning	<ul style="list-style-type: none"> Principles Signal level and bias change Linearization Loading effect Voltage dividers Bridges Filters Diode as Demodulator Voltage regulator 	3 weeks
2	Operational amplifiers	<ul style="list-style-type: none"> Characteristics and specifications Inverting and non-inverting Voltage follower Summing amplifier Differential amplifier Instrumentation amplifier Integrators and differentiators Logarithmic amplifiers 	2 weeks
3	Converters	<ul style="list-style-type: none"> Current to voltage converter Voltage to current converter Digital to Analog converts Analog to digital Converters Sample and Hold Circuit Serial to parallel converter Parallel to Serial converter Current to pressure converter Pressure to current converter 	3
4	Digital signal conditioning	<ul style="list-style-type: none"> Tristate buffer Comparators Hysteresis comparator (Schmitt Trigger) Latch TTL and CMOS Integrated Circuits Pulse Width Modulation 	2 weeks
5	Switching devices	<ul style="list-style-type: none"> Transistor as a switch Silicon controlled rectifier Gate Turn Off Thyristor 	3 weeks

Evaluation Strategies:

		Percentage	Date
1. Exams	First Exam	20%	/ /20__
	Second Exam	20%	/ /20__
	Final Exam	50%	/ /20__
2. Homework and Projects		10%	/ /20__
Total		100%	

Teaching Methodology:

- Lectures
- PowerPoint slides
- Term projects

Text Books & References:

Textbooks

1. Process control instrumentation Technology Curtis D. Johnson 8-th ed.
2. Introduction to Mechatronics and Measurement Systems, David G. Alciatore, Fourth Edition

References

Circuit Analysis with Multisim , David Báez-López and Félix E. Guerrero-Castro 2011