COURSE	Name	: Electronic Circuit Systems
	Code	: EE185241
	Credit(s)	: 3
	Semester	: II

Description of Course

This course discusses the analysis, design, and implementation of analogue and digital circuits in electronic systems. Analogue circuit implementation is focused on operational amplifier design in CMOS VLSI from simulation to IC layout, as well as opamp-based circuit design. Digital circuits implementations uses FPGA technology and emphasised for signal processing applications.

Learning Outcomes

Knowledge

(P02) Mastering engineering concepts and principles to develop the necessary procedures and strategies for systems analysis and design in the areas of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

Specific Skill

(KK04) Being able to implement alternative solutions of engineering problems by concerning in factors of economy, public health and safety, culture, social, and environment.

General Skill

(KU02) Being able to perform academic validation or studies in accordance with their areas of expertise in solving problems in relevant communities or industries through the development of knowledge and expertise.

Attitude

(S09) To show responsibility on their works in the field of expertise.

Course Learning Outcomes

Knowledge

Mastering the concepts and engineering principles to develop procedures and strategies needed for the analysis, design, and implementation of analogue and digital electronic systems, with emphasis on analogue IC design and digital logic circuit implementation on FPGA technology.

Specific Skill

Able to design CMOS analogue circuits and implement digital logic circuits on FPGA technology as alternative solutions for engineering problems in the field of electronics, considering factors such as economy, public health and safety, culture, society, and the environment.

General Skill

Able to undertake the study and analysis on analogue and digital circuits technology.

Attitude

Showing responsibility in the field of expertise.

Main Subjects

1. Principles of electronic circuits analysis, covering diode, bipolar transistors, and field-effect transistors circuits.
2. Principles of operational amplifier circuits, including oscilators and filters.
3. Principles of integrated circuits (IC) technology, fabrication process, layout, mask/layer, and design rules, as well as IC design software tools, synthesis, and verification.
4. CMOS operational amplifier circuit design, from simulation to layout.
5. Hardware description language for the implementation of combinational and sequential digital circuits.
6. FPGA technology and architecture as digitally configurable device.
7. Arithmetic digital circuits implementation.
8. Signal processing systems implementation on FPGA.

Reference(s)

[1] R. Jacob Baker, “CMOS Circuit Design, Layout, and Simulation”, 2nd edition, IEEE Press, Wiley-Interscience, 2005, USA.
[2] Adel Sedra, Kenneth Smith, “Microelectronic Circuits: Theory and Applications”, 6th edition, Oxford University Press, 2011.
[3] Ben Streeman, Sanjay Banerjee, “Solid State Electronic Devices”, 6th edition, Pearson, 2006.

Prerequisite(s)

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