



Koneru Lakshmaiah Education Foundation

(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

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Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA.

Phone No. +91 8645 - 350 200; www.klef.ac.in; www.klef.edu.in; www.kluniversity.in

Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002. Ph: +91 - 866 - 3500122, 2576129

Department of Electronics and Communication Engineering

Program: M. Tech - VLSI

Academic Year: 2022-24

Course Code	Course Name	CO NO	CO Description
22EC5128	MOS Circuit Design	1	Apply basic concepts of VLSI design flow, Design styles, IC fabrication, layout design rules for CMOS circuits. and MOS transistor and circuit modeling.
		2	Explain and Analyze MOS static characteristics and interconnect effects.
		3	Demonstrate the design concepts of Combinational and Sequential MOS logic Circuits.
		4	Apply Combinational and Sequential MOS logic Circuits to build different Dynamic logic circuits
		5	Construct of Various CMOS Circuits using EDA Tools.
22EC5129	Digital VL SI Design	1	Understand and apply the Verilog HDL concepts for combinational logic.
		2	Understand and apply the Verilog HDL concepts for sequential logics
		3	Apply the synchronous design and ASM techniques in design of digital systems
		4	Analyze the reliability of digital systems by applying testing techniques

		5	Design of various digital systems by using EDA tools
22EC5130	Low Power VLSI System Design	1	Understand the physics of power dissipation including short circuit power, dynamic power and leakage power, techniques
		2	Analyses probabilistic power analysis and apply low power techniques at circuit level for CMOS circuits
		3	Apply low power techniques at gate level, architecture level and system levels
		4	Realize essential tasks in algorithm and architecture level low power design environments
		5	Experiment and design VLSI circuits with various low-power techniques using the Cadence VLSI design suite.
22EC5104	Artificial Intelligence & Machine Learning	1	Understanding of basic search algorithms
		2	Study and applications of ANN and deep learning
		3	Application of various ML techniques of kMeans, kNN, SVM and GMM
		4	Understand of various advance computing methods
		5	Analysis and implementation of ML and genetic algorithm computing for various applications
22EC51Q1	IC Fabrication Technology	1	Ability to understand the Concepts of design methodologies in routing and layout
		2	Understand different levels of modelling of digital circuits and scheduling
		3	Ability to understand the FPGA Technologies for development of physical design

		4	Analyze the routing and distribution of cells in ICs
22EC51Q2	System-on-Chip	1	Acquire knowledge about Top-down SoC design flow
		2	Understand the system level design of communication networks.
		3	Apply system level design and analyze MPSoC concepts
		4	Acquire knowledge about NoC
22EC51Q3	Nano Electronics	1	Understand nanoelectronics and shrink-down approach
		2	Interpret the concept behind nano MOSFET and nanodevices
		3	Apply and Analyze the Schrodinger equation for different types of potentials in one dimension
		4	Understand the process of nanofabrication and characterization facilities
22EC51Q4	Semiconductor Device Modeling	1	Understand the basic device physics and study of MOS capacitor
		2	Understand and study of MOSFET physics and characteristics.
		3	Understanding the energy band diagrams of BJT and time dependent analysis.
		4	Understanding the concepts of designing of emitter, base and collector and study of modern BJT.
22EC51R1	VLSI Signal Processing	1	Understand the basic concepts and processes of VLSI and DSP with iteration bound and means the computation time for the system.
		2	To study pipelining and parallel processing for different filters
		3	Analyse about different properties of retiming and unfolding techniques

		4	Analyse about convolution and Filters and Transforms.
22EC51R2	Internet of Things Architecture and Protocols	1	Understand the concepts of IoT Architecture, Reference model and IoT enabling technologies.
		2	Understand the logical design of IoT system and communication technologies.
		3	Understand IoT networking protocols and Authentication Protocols for IoT Application layer.
		4	Apply IoT protocols and programming concepts for real-world problems.
22EC51R3	VLSI Circuits for Bio-Medical Applications	1	Understand the basic Concept of Neural activity of the brain
		2	Understand and design a CMOS circuits for Implantable devices
		3	Analyze the use of Wireless technology in medical devices
		4	Analyze the Microneedle fabrication and Biochip for Biomedical Applications
22EC51R4	Optimization Techniques in VLSI Design	1	Understand basics of statistical modeling
		2	Understand the basic Concept of placement and partitioning of standard cell through genetic algorithm
		3	Analyze the performance of CMOS circuits with respect to power, area and speed
		4	Analyze the various algorithms used for optimization of power and area
22IE5149	Seminar	1	Enhancing verbal delivery, body language, power point skills, structuring the presentation, engaging audience, tone of presentation for the overall improvement of individual presentation skills.

22EC5232	Analog IC Design	1	Application of the MOS transistors for the design of single stage amplifiers.
		2	Analysis and design of active & passive current Mirrors and the differential amplifiers with qualitative and quantitative analysis.
		3	Analyze the CMOS Op Amps, and various types of Op Amps with qualitative and quantitative approaches.
		4	Analyze the high frequency response of CS, CG and CD amplifiers and noise analysis of various amplifiers and analysis of non-linear analog circuits like switched capacitor circuits, PLL, ADC and DAC.
		5	Design and analysis of various MOS analog circuits using Cadence/ LT-SPICE environment for real time applications.
22EC5233	Testing of VL SI Circuits	1	Understanding and application user-defined primitives in Fault dominance and Gate level event-driven simulation for digital circuits.
		2	Understanding, Test generation for various Combinational logic circuits and ability to design its Testable Combinational circuits.
		3	Design for Testability, Generic scan-based design and Classical scan-based design
		4	Analyze and ability to Testable various BIST– MBIST, L BIST.
		5	Understand Fault Diagnosis of digital circuits and Diagnosis by UUT reduction.
22EC5234	Algorithms for VL SI Design	1	Understand of VLSI Design Automation
		2	Understand basic concepts and flow in hardware design
		3	Identify algorithms required for circuit simulators

		4	Apply and Analyse timing analysis with FPGA based design
22EC51S1	Advanced Digital IC Design	1	Understand the implantation Strategies for Digital ICs
		2	Understand the Timing Issues in Digital Circuits
		3	Understand the Designing of Arithmetic Building Blocks
		4	Understand the Designing Memory and Array Structures
22EC51S2	Embedded System Design	1	Understand basic concepts in the embedded computing systems
		2	Understand the various types of peripherals used in embedded systems.
		3	Understand real time embedded systems using the concepts of RTOS
		4	Acquire knowledge on networks for embedded systems
22EC51S3	CAD Tools for VL SI	1	Understand VLSI design methodologies and CAD environment
		2	Acquire knowledge on types of CAD simulations
		3	Understand different optimization algorithms for VLSI design automation
		4	Understand the advancement of VLSI CAD
22EC51S4	Memory Design and Testing	1	Understand the concepts of static RAM and Dynamic RAM
		2	Acquire knowledge on types memory testing
		3	Understand the concepts of semiconductor memory reliability and radiation Effects
		4	Understand the advancement of memory technologies
22EC51T1	FPGA-Based Wireless System Design	1	Understand basic concepts of software defined radio
		2	Analysis of FPGA Speed, Area & Power

		3	Acquire knowledge on advanced encryption standards
		4	Understand the FPGA for wireless system application
22EC51T2	RF Mixed Signal IC Design	1	Understanding working principles of RF integrated circuit design
		2	Acquire knowledge on transmission medias and reflections of RF design
		3	Apply and analyze the noise over RF design
		4	Realize the voltage control oscillator for RF design
22EC51T3	MEMS System Design	1	Understand and the concepts of MOS circuit design
		2	Analyze different types of buffers in mos circuits
		3	Analyze the layouts of MOS circuits
		4	Analyze total circuit design of MOS circuits
22EC51T4	Block Chain & Cyber Security	1	Understand emerging abstract models for Block chain Technology
		2	Analyze the concept of bit coin and mathematical background behind it
		3	Apply the tools for understanding the background of crypto currencies
		4	Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain