Course Outcomes of VLS

Sr. No.	Course Code & Title	Course Outcomes	
1	Organic and Flexible Electronics (VLS5307)	VLS5307.1	Identify different organic materials for thin layers of transistor based on application.
		VLS5307.2	Define different structures and operating principle for thin film transistor.
		VLS5307.3	Determine performance parameters for TFT by applying analytical model.
		VLS5307.4	Illustrate analog and digital circuits by using all-p organic transistors.
		VLS5307.5	Explain multilayered organic LED and solar cell for low power application.
2	Analog IC Design (EC501)	VLS501.1	Design of the Single-stage MOS amplifiers and Differential amplifiers.
		VLS501.2	Frequency and noise analysis of MOS amplifiers and differential amplifiers.
		VLS501.3	Design and performance analysis of the MOS operational amplifiers.
		VLS501.4	Analysis and design of various current mirrors.
		VLS501.5	Design and analyze voltage reference circuits.
3	IC Technology (VLS5407)	VLS5407.1	To identify different demiconductor material properties and defects.
		VLS5407.2	Evaluate Epitaxy and Oxidation technologies in VLSI & ULSI.
		VLS5407.3	Identify lithography & mask generation techniques.
		VLS5407.4	Explain Metallization.
		VLS5407.5	Evaluate chip packaging and bonding.
		VLS5407.6	Explain nanoscale devices for CMOS & Bipolar circuits.
4	Digital CMOS IC Design (VLS503)	VLS503.1	Describe the technology, design concepts, electrical properties and modelling of MOS device.
		VLS503.2	Analyze static and timing parameters of inverters and design inverters as per specification.
		VLS503.3	Design static combinational logic circuits using CMOS, Transmission gates and complementary pass transistor logic.
		VLS503.4	Apply dynamic circuit techniques to combinational circuit design.
		VLS503.5	Design and Analyze Static and Dynamic Sequential logic circuit and evaluate timing parameters.
		VLS503.6	Describe design process of memory, design methodologies and apply concept of hierarchy, modularity and locality in designs.

5	**SELF STUDY OPEN AREA SEMINAR - I (VLS-5201)**	VLS5201.1	Demonstrate technical knowledge of the selected seminar topic.
		VLS5201.2	Develop a thorough literature survey to describe previous related work, and identify research gaps, problem formulation, and solutions for the selected topic.
		VLS5201.3	Prepare a technical document/ report in a specified format with well-mentioned and appropriate citations, references and key concepts.
		VLS5201.4	Produce the presentation materials effectively and creatively for disseminating the content and information of the selected topic.
		VLS5201.5	Demonstrate soft skills to communicate with insight and clarity in multi-disciplinary groups.
6	**Embedded System (VLS 502)**	VLS502.1	Comprehend basic principles of a microcontroller and identify its need.
		VLS502.2	Identify basic architecture of a 8-bit, 16-bit and 32 bit Microcontroller and demonstrate programming skills using PIC and ARM microcontroller.
		VLS502.3	Describe the internal architecture and interfacing of different peripheral devices with Microcontrollers.
		VLS502.4	Illustrate the need and working principles of Digital Signal Processors and their variants.
		VLS502.5	Discuss memory organization of ARM Microcontroller and its variants', RT-Linux introduction, RTOS kernel and Real-Time Scheduling Bus structure.
7	**CMOS RF Circuit Design (VLS5408)**	VLS5408.1	Explain basic radio frequency concepts.
		VLS5408.2	Explain non linearity and its effects.
		VLS5408.3	Explain LNA, mixers.
		VLS5408.4	Explain and design power amplifiers.
		VLS5408.5	Explain and design RF transmitters.
		VLS5408.6	Explain and design RF Receivers.
8	**Real Time Operating System (VLS5204)**	VLS5204.1	Discover the foundations of operating systems.
		VLS5204.2	Comprehend the fundamentals of modelling and Real-Time Operating Systems.
		VLS5204.3	Describe the states, task services, structures, and other core operations of real-time operating systems.
		VLS5204.4	Determine the distinctions between various scheduling methods, such as priority preemptive schedulers and table-driven schedulers.
		VLS5204.5	Utilize semaphores and mutexes to synchronize tasks that the operating system has established.
		VLS5204.6	Study basic principle and advance aspects of Real-Time Operating Systems.

9	**Low Power VLSI Deign (VLS504)**	VLS504.1	Explain the sources of power dissipation in digital ICs.
		VLS504.2	Illustrate the power estimation at logic and circuit level.
		VLS504.3	Apply logical effort theory to size transistors .
		VLS504.4	Categorize low power techniques at circuit, logic architecture and system level.
		VLS504.5	Design and Analyze arithmetic circuits and evaluate timing parameters.
		VLS504.6	Explain timing issues in synchronous circuits and design asynchronous circuits.
10	**Minor Project (VLS5302)**	VLS5302.1	Identify the probem statement and formulate it.
		VLS5302.2	Develop a methodology to implement the project.
		VLS5302.3	Design/Fabricate and Test using state-of-art tools and components.
		VLS5302.4	Demonstrate the outcome/prototype.
		VLS5302.5	Effective report writing with scope for future extension.
11	**Major Project I (VLS601)**	VLS601.1	Identify the probem statement and formulate it.
		VLS601.2	Develop a methodology to implement the project.
		VLS601.3	Design/Fabricate and Test using state-of-art tools and components.
		VLS601.4	Demonstrate the outcome/prototype.
		VLS601.5	Effective report writing with scope for future extension.
12	**Mixed Signal Design (VLS6401)**	VLS6401.1	Design and Analysis of Switched Capacitor Circuits.
		VLS6401.2	Design and Analysis of Switched Capacitor integrators and filters.
		VLS6401.3	Design and Analysis of Phase locked loops.
		VLS6401.4	Demonstrate Data converter fundamentals.
		VLS6401.5	Discuss different types of data converter.
13	**Machine Learning (VLS6305)**	VLS6305.1	Explain the fundamental principles and applications of Machine Learning.
		VLS6305.2	Implement Linear Models and visualize the outcomes.
		VLS6305.3	Apply linear and logistic regression analysis.
		VLS6305.4	Compare different paradigms for supervised and unsupervised learning methods.
		VLS6305.5	Design efficient algorithms to solve real-world problems.

14	**Selected Topics in VLSI (VLS6207)**	VLS6207.1	Determine and describe the limitations of Conventional MOSFETs.
		VLS6207.2	Apply concepts of semiconductor devices to design and analyze FETs.
		VLS6207.3	Identification of different structures overcoming limitations of Conventional MOSFETs.
		VLS6207.4	Determine performance parameters for different structures by applying analytical model.
		VLS6207.5	Illustrate analog and digital circuits by using different structures .
15	**Major Project II (VLS602)**	VLS602.1	Identify the probem statement and formulate it.
		VLS602.2	Develop a methodology to implement the project.
		VLS602.3	Design/Fabricate and Test using state-of-art tools and components.
		VLS602.4	Demonstrate the outcome/prototype.
		VLS602.5	Effective report writing with scope for future extension.