DEPARTMENT OF ELECTRONICS AND COMMUNICATIONS ENGINEERING

M.E (VLSI) Regulation-2021 Course Outcomes

S.No	Year / Sem	Course Code	Course Name	Course Outcome
1	I/ I	VL4153	GRAPH THEORY AND OPTIMIZATION TECHNIQUES	CO1:Apply graph ideas is solving connectivity related problems. CO2:Apply fundamental graph algorithms to solve certain optimization problems. CO3:Formulate and construct mathematical models for linear programming problems and solve the transportation and assignment problems. CO4:Model various real life situations as optimization problems and effect their solution through Non-linear programming. CO5:Apply simulation modeling techniques to problems drawn from industry management and other engineering fields.
2	I/ I	VL4151	ANALOG IC DESIGN	CO1:Design amplifiers to meet user specifications. CO2:Analyse the frequency and noise performance of amplifiers. CO3:Design and analyse feedback amplifiers and one stage op amps. CO4:Design and analyse two stage op amps. CO5:Design and analyse current mirrors and current sinks with mos devices.
3	I/ I	VL4152	DIGITAL CMOS VLSI DESIGN	CO1:Use mathematical methods and circuit analysis models in analysis of CMOSdigital circuits. CO2:Create models of moderately sized static CMOS combinational circuits that realize specified digital functions and to optimize combinational circuit delay using RC delay models and logical effort. CO3:Design sequential logic at the transistor level and compare the tradeoffs of sequencing elements including flip-flops, transparent latches. CO4:Understand design methodology of arithmetic building blocks. CO5:Design functional units including ROM and SRAM.
4	I/ I	AP4152	ADVANCED DIGITAL SYSTEM DESIGN	CO1:Analyse and design synchronous sequential circuits. CO2:Analyse hazards and design asynchronous sequential circuits. CO3:Knowledge on the testing procedure for combinational circuit and PLA. CO4:Able to design PLD and ROM. CO5:Design and use programming tools for implementing digital circuits of industry standards.
5	I/ I	AP4153	SEMICONDUCTOR DEVICES AND MODELING	CO1:Explore the properties of MOS capacitors. CO2:Analyze the various characteristics of MOSFET devices. CO3:Describe the various CMOS design parameters and their impact on performance of the device. CO4:Discuss the device level characteristics of BJT transistors. CO5:Identify the suitable mathematical technique for simulation.

6	I/ I	VL4111	FPGA LABORATORY	CO1:Understand and use the System Verilog RTL design and synthesis features, including newdata types, literals, procedural blocks, statements, and operators, relaxation of Verilog languagerules, fixes for synthesis issues, enhancements to tasks and functions, new hierarchy andconnectivity features, and interfaces. CO2:Appreciate and apply the System Verilog verification features, including classes, constrained random stimulus, coverage, strings, queues and dynamic arrays, and learn how to utilize these features for more effective and efficient verification. CO3:The implementation of higher level of abstraction to design and verification. CO4:Develop Verilog test environments of significant capability and complexity. CO5:Integrate scoreboards, multichannel sequencers and Register Models.
7	I/ I	VL4112	ANALOG IC DESIGN LABORATORY	CO1:Design digital and analog Circuit using CMOS given a design specification. CO2:Design and carry out time domain and frequency domain simulations of simple analog building blocks, study the pole zero behaviors and compute the input/output impedances. CO3:Use EDA tools for Circuit Design.
8	I/ II	VL4251	DESIGN FOR VERIFICATION USING UVM	CO1:Understand the basic concepts of two methodologies UVM. CO2:Build actual verification components. CO3:Generate the register layer classes. CO4:Code test benches using UVM. CO5:Understand advanced peripheral bus test benches.
9	I/ II	VL4291	LOW POWER VLSI DESIGN	CO1:Able to find the power dissipation of MOS circuits. CO2:Design and analyze various MOS logic circuits. CO3:Apply low power techniques for low power dissipation. CO4:Able to estimate the power dissipation of ICs. CO5:Able to develop algorithms to reduce power dissipation by software.
10	I/ II	VL4292	RFIC DESIGN	CO1:To understand the principles of operation of an RF receiver front end. CO2:To design and apply constraints for LNAs, Mixers and frequency synthesizers. CO3:To analyze and design mixers. CO4:To design different types of oscillators and perform noise analysis. CO5:To design PLL and frequency synthesizer.
11	I/ II	VL4252	VLSI TESTING	CO1:Understand VLSI Testing Process. CO2:Develop Logic Simulation and Fault Simulation. CO3:Develop Test for Combinational and Sequential Circuits. CO4:Understand the Design for Testability. CO5:Perform Fault Diagnosis.
12	I/ II	VE4152	EMBEDDED SYSTEM DESIGN	CO1:Knowledge of different protocols. CO2:Apply state machine techniques and design process models. CO3:Apply knowledge of embedded software development tools and RTOS. CO4:Apply networking principles in embedded devices. CO5:Design suitable embedded systems for real world applications.
13	I/ II	VL4006	ADVANCED WIRELESS SENSOR NETWORKS	CO1:Design and implement simple wireless network concepts. CO2:Design, analyze and implement different network architectures. CO3:Implement MAC layer and routing protocols. CO4:Deal with timing and control issues in wireless sensor networks. CO5:Analyze and design secured wireless sensor networks.

14	I/ II	VL4211	VERIFICATION USING UVM LABORATORY	CO1:Understand the features and capabilities of the UVM class library for system Verilog. CO2:Combine multiple UVCs into a complete verification environment. CO3:Create and configure reusable, scalable, and robust UVM verification components (UVCs). CO4:Create a UVM testbench structure using the UVM library base classes and the UVM factory. CO5:Develop a register model for your DUT and use the model for initialization and accessing DUT Registers.
15	II/ III	VL4351	VLSI SIGNAL PROCESSING	CO1:Ability to determine the parameters influencing the efficiency of DSP architectures and apply pipelining and parallel processing techniques to alter FIR structures for efficiency. CO2:Ability to analyse and modify the design equations leading to efficient DSP architectures for transforms apply low power techniques for low power dissipation. CO3:Ability to speed up convolution process and develop fast and area efficient IIR structures. CO4:Ability to develop fast and area efficient multiplier architectures. CO5:Ability to reduce multiplications and build fast hardware for synchronous digital systems.
16	II/ III	VL4092	SOFT COMPUTING AND OPTIMIZATION TECHNIQUES	CO1:Develop application on different soft computing techniques like Fuzzy, GA and Neural Network. CO2:Implement Neuro-Fuzzy and Neuro-Fuzz-GA expert system. CO3:Implement machine learning through Neural networks. CO4:Model Neuro Fuzzy system for clustering and classification. CO5:Able to use the optimization techniques to solve the real world problems.
17	II/ III	CP4252	MACHINE LEARNING	CO1:Understand and outline problems for each type of machine learning. CO2:Design a Decision tree and Random forest for an application. CO3:Implement Probabilistic Discriminative and Generative algorithms for an application and analyze the results. CO4:Use a tool to implement typical Clustering algorithms for different types of applications. CO5:Design and implement an HMM for a Sequence Model type of application and identify applications suitable for different types of Machine Learning with suitable justification.
18	II/ III	ET4251	IoT FOR SMART SYSTEMS	CO1:Analyze the concepts of IoT and its present developments. CO2:Compare and contrast different platforms and infrastructures available for IoT. CO3:Explain different protocols and communication technologies used in IoT. CO4:Analyze the big data analytic and programming of IoT. CO5:Implement IoT solutions for smart applications.