



Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
1	20ELD11 / Advanced Engineering Mathematics	C101.1	Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images
		C101.2	Apply the technique of singular value decomposition for data compression, least square approximation in solving inconsistent linear systems
		C101.3	Utilize the concepts of functional and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits
		C101.4	Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications
		C101.5	Analyze random process through parameter-dependent variables in various random processes

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
2	20EVE12 / ASIC Design	C102.1	Describe the concepts of ASIC design methodology, data path elements, logical effort and FPGA Architectures
		C102.2	Analyze the design of FPGAs and ASICs suitable for specific tasks, perform design entry and explain the physical design flow
		C102.3	Design data path elements for ASIC cell libraries and compute optimum path delay
		C102.4	Create floor plan including partition and routing with the use of CAD algorithms
		C102.5	Design CAD algorithms and explain how these concepts interact in ASIC design

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
3	20EVE13 / Advanced	C103.1	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system

	Embedded System	C103.2	Explain the hardware software co-design and firmware design approaches
		C103.3	Understand the suitability of the instruction sets of ARM processors to design of embedded systems
		C103.4	Acquire the knowledge of the architectural features of ARM CORTEX M3, a 32-bit microcontroller including memory map, interrupts and exceptions
		C103.5	Apply the knowledge gained for Programming ARM CORTEX M3 for different applications

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
4	20EVE14 / VLSI Testing	C104.1	Analyze the need for fault modeling and testing of digital circuits
		C104.2	Generate fault lists for digital circuits and compress the tests for efficiency
		C104.3	Create tests for digital memories and analyze failures in them
		C104.4	Apply boundary scan technique to validate the performance of digital circuits
		C104.5	Design built-in self-tests for complex digital circuits

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
5	20EVE15 / Digital VLSI Design	C105.1	Analyse issues of On-chip interconnect Modelling and Interconnect delay calculation
		C105.2	Analyse the Switching Characteristics in Digital Integrated Circuits
		C105.3	Use the Dynamic Logic circuits in state-of-the-art VLSI chips
		C105.4	Study critical issues such as ESD protection, Clock distribution, Clock buffering, and Latch phenomenon
		C105.5	Use Bipolar and Bi-CMOS circuits in very high-speed design

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
6	20EVEL16 / VLSI & ES Lab-1	C106.1	Understand the features of CAD tool in VLSI design
		C106.2	Design and verify the behavior of digital circuits using digital flow

		C106.3	Verify the design using a logic analyzer
		C106.4	Analyse physical design
		C106.5	Develop Assembly language programs and C language programs for different applications using ARM Cortex M3 Kit and Keil uVision-4 tool

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
7	20RMI17 / Research Methodology and IPR	C107.1	Discuss research methodology and the technique of defining a research problem
		C107.2	Explain the functions of the literature review in research, carrying out a literature search, developing theoretical and conceptual frameworks and writing a review
		C107.3	Explain various research designs, sampling designs, measurement and scaling techniques and also different methods of data collections
		C107.4	Explain several parametric tests of hypotheses, Chi-square test, art of interpretation and writing research Reports
		C107.5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
8	20EVE21 / Design of Analog & Mixed Mode VLSI Circuits	C108.1	Use efficient analytical tools for quantifying the behaviour of basic circuits by inspection
		C108.2	Design high-performance, stable operational amplifiers with the trade-offs between speed, precision and power dissipation
		C108.3	Design and study the behaviour of phase-locked-loops for the applications
		C108.4	Identify the critical parameters that affect the analog and mixed-signal VLSI circuits' performance
		C108.5	Perform calculations in the digital or discrete time domain, more sophisticated data converters to translate the digital data to and from inherently analog world

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
---------	-----------------------------	-------------	-----------------

9	20EVE22 / Real Time Operating System	C109.1	Develop programs for real time services, firmware and RTOS, using the fundamentals of Real Time Embedded System, real time service utilities, debugging methodologies and optimization techniques
		C109.2	Select the appropriate system resources (CPU, I/O, Memory, Cache, ECC Memory, Microcontroller/FPGA/ASIC to improve the system performance
		C109.3	Apply priority based static and dynamic real time scheduling techniques for the given specifications
		C109.4	Analyze deadlock conditions, shared memory problem, critical section problem, missed deadlines, availability, reliability and QoS
		C109.5	Develop programs for multithreaded applications using suitable techniques and data structure

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
10	20EVE23 / System Verilog	C110.1	Write test benches for moderately complex digital circuits
		C110.2	Use System Verilog language
		C110.3	Appreciate functional coverage
		C110.4	Apply constrained random tests benches using System Verilog
		C110.5	Analyze a verification case and apply System Verilog to verify the design

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
11	20EVE241 / Advances in VLSI Design	C111.1	Apply design automation for complex circuits using the different implementation methodology like custom versus semi-custom, hardwired versus fixed, regular array versus ad-hoc
		C111.2	Use the approaches to minimize the impact of interconnect parasitics on performance, power dissipation and circuit reliability
		C111.3	Impose the ordering of the switching events to meet the desired timing constraints using synchronous, clocked Approach
		C111.4	Infer the reliability of the memory
		C111.5	Understand the role of peripheral circuitry such as the decoders, sense amplifiers, drivers and control circuitry in the design of reliable and fast memories

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
12	20EVE251 / Low Power VLSI Design	C112.1	Identify the sources of power dissipation in CMOS circuits
		C112.2	Perform power analysis using simulation-based approaches and probabilistic analysis
		C112.3	Use optimization and trade-off techniques that involve power dissipation of digital circuits
		C112.4	Make the power design a reality by making power dimension an integral part of the design process
		C112.5	Use practical low power design techniques and their analysis at various levels of design abstraction and analyse how these are being captured in the latest design automation environments

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
13	20EVEL26 / VLSI & ES Lab-2	C113.1	Design, implement and analyse analog, digital and mixed mode circuits
		C113.2	Learn the various issues in Mixed signal designs basically data converters
		C113.3	Acquire hands-on skills of using CAD tools in VLSI design and appreciate the design process in VLSI through a mini-project on the design of a CMOS sub-system
		C113.4	Implement different techniques of message passing and Inter task communication
		C113.5	Implement different data structures such as pipes, queues and buffers in multithreaded programming and also select a suitable task switching technique in a multithreaded application

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
14	20EVE31 / CAD of Digital Systems	C201.1	Understand the various design methodologies
		C201.2	Solve graph theoretic problems
		C201.3	Evaluate the computational complexity of an algorithm
		C201.4	Write algorithms for VLSI Automation
		C201.5	Simulate and synthesize digital circuits using VLSI automation tools

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
15	20ECS321 / Machine Learning in VLSI CAD	C202.1	Use machine learning technologies in VLSI CAD to further automate the design, verification and implementation of the most advanced chips
		C202.2	Relate to the usage of machine learning algorithms for Compact Lithographic Process Models
		C202.3	Apply Machine Learning in Mask Synthesis and Physical Verification to bear on CAD problems such as hot-spot detection, efficient test generation, post-silicon measurement minimization
		C202.4	Predict the Yield and Reliability of VLSI chips using machine learning methods
		C202.5	Comprehend the appropriate application of the various supervised, unsupervised and statistical learning in the various layers of chip design hierarchy

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
16	20ECS333 / Internet of Things	C203.1	Understand the basic concepts IoT Architecture and devices employed
		C203.2	Analyze the sensor data generated and map it to IoT protocol stack for transport
		C203.3	Apply communications knowledge to facilitate transport of IoT data over various available communications Media
		C203.4	Design a use case for a typical application in real life ranging from sensing devices to analyzing the data available on a server to perform tasks on the device
		C203.5	Apply knowledge of Information technology to design of IoT applications (Operational Technology)

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
17	20EVE34 / Project Work phase -1	C204.1	Demonstrate a sound technical knowledge of their selected project topic
		C204.2	Undertake problem identification, formulation and solution
		C204.3	Design engineering solutions to complex problems utilising a systems approach
		C204.4	Communicate with engineers and the community at large in written and oral-forms
		C204.5	Demonstrate the knowledge, skills and attitudes of a professional engineer

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
18	20EVE35 / Mini-Project	C205.1	Present the mini-project and be able to defend it
		C205.2	Make links across different areas of knowledge and generate, develop and evaluate ideas and information so as to apply these skills to the project task
		C205.3	Habituated to critical thinking and use problem-solving skills
		C205.4	Communicate effectively and to present ideas clearly and coherently in both written and oral forms
		C205.5	Work in a team to achieve a common goal

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
19	20EVEI36 / Internship	C206.1	Gain practical experience within industry in which the internship is done
		C206.2	Acquire knowledge of the industry in which the internship is done
		C206.3	Apply knowledge and skills learned to classroom work
		C206.4	Develop a greater understanding about career options while more clearly defining personal career goals
		C206.5	Experience the activities and functions of professionals

Sl. No.	Subject Code / Subject Name	Course Code	Course Outcomes
20	20EVE41 / Project work phase -2	C207.1	Present the project and be able to defend it
		C207.2	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task
		C207.3	Habituated to critical thinking and use problem solving skills
		C207.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
		C207.5	Learn on their own, reflect on their learning and take appropriate actions to improve it