ME (ES & VLSID)

R20:

Vision: To emerge as a vibrant model of excellence in education, research and innovation in Electronics and Communication Engineering

Mission:

M1: To impart strong theoretical and practical knowledge of the state of art technologies to meet growing challenges in the industry.

M2: To carry out the advanced and need based research in consultation with the renowned research and industrial organizations.

M3: To create entrepreneurship environment including innovation, incubation and encourage to patent the work.

Program Educational Objectives of M.E (Embedded Systems and VLSI Design) Program

PEO1: Graduates will apply engineering expertise to solve real world problems in the areas of Embedded Systems and VLSI Design.

PEO2: Graduates will have the ability to adopt latest technologies.

PEO3: Graduates will be able to carry out research in the fields of Micro Electronics and Embedded Systems.

PEO4: Graduates will develop professional ethics, effective communication skills, self-confidence and societal responsibilities.

Program Outcomes of M.E (Embedded Systems and VLSI Design) Program
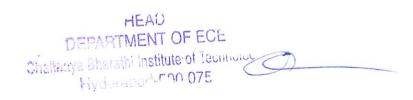
PO1: An ability to independently carry out research /investigation and development work to solve practical problems.

PO2: An ability to write and present a substantial technical report/document.

PO3: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.

PO4: Students will be able to use modern engineering tools/software to design and develop Embedded and VLSI Systems as per the needs of the Industry.

PO5: Students will be able to develop self-confidence, team work, skills for lifelong learning and committed to social responsibilities.

HEAD
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Chaitanya Bharathi Institute of Technology
Hyderabad - 500 075

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (Autonomous)
Gandipet, Hyderabad -75
Department Of Electronics and Communication Engineering
Course Outcomes Statements for ME (ES & VLSID)-R20

SNo	Course Code	Course Name	Course Outcomes Statements
1.	20ECC201	Analog and Digital CMOS VLSI Design	Understand MOS structure, it's Behavior & fabrication process, various step in physical design flow of CMOScircuits, second order effects in MOS &ESD Models.
			Design various types of combinational logic circuits and sequential logic circuits
			Recall various advanced technologies in VLSI industry, the scaling issues, etc.
			Analyze various analog amplifiers, Current mirror circuits and OP AMP
			Design Basic Amplifiers, Current Mirrors, basic OPAMP, OP-AMP with different compensations
2.	20ECC202	Embedded System Design using RTOS	Understand the concepts of UNIX operating system and process management.
			Describe the POSIX standards for real time systems and compare hard and soft real time systems.
			Analyze various scheduling algorithms and application to real time systems.
			Illustrate the concepts of real time operating system and VxWorks.
			Elucidate the concepts software development tools and RTOS comparison.
3.	20ECC203	Microcontrollers and Programmable Digital Signal Processors	Compare and select ARM processor core based on requirements of embedded application
			Analyze various features of ARM Cortex-M Series Processor
			Able to interface various I/O devices to ARM7 microcontrollers
			Understand the basic architectural needs of Programmable DSPs
			Apply small applications on DSP processor-based platform
4.	20ECC204	VLSI Design Verification and Testing	Recipe of front-end design verification techniques and create reusable test bench environments.
			Understanding various data types used in System Verilog
			Demonstrating OOPs concepts to System Verilog verification
			Application of Randomization concept in System Verilog
			Interface a System Verilog testbench with System C
5.	20ECC205	Analog and Digital CMOS VLSI Design Lab	Verify the characteristics of MOSFET and design entry in the tool.
			Understand and evaluate the design specs and library files of tool.
			Apply the concept of theory and design in the lab implementation.
			Analyze and calculation, power and delay from the graphs.
			Compare performance of different circuits with the simulation results.
6.	20EC C206	Microcontrollers and Programmable Digital Signal Processors Lab	Install, configure and utilize tool sets for developing applications based on ARM processorcore.
			DesignanddeveloptheARM7 basedembeddedsystemsforvarious applications.
			DevelopapplicationprogramsonARMandDSPdevelopmentboards both in assembly and C.
			DesignandImplementthedigitalfiltersonDSP6713processor.
			Analyze the hardware and software interaction andintegration

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7.	20ECC207	RTL Simulation and Synthesis with PLDs Lab	Demonstrate the process steps required for simulation /synthesis.
			Design and simulate various combinational and sequential circuits using HDL
			Develop an RTL code for various real time applications.
			Synthesize an RTL code for several digital designs.
			Build a prototype for various digital circuits with PLDs.
8.	20ECC208	RTOS and VLSI Design Verification Lab	Verify a few important OOPs concepts
			Compile and Run various design constructs using CAD tool
			Develop self-checking test benches using SystemVerilog
			Understand the programming concepts of RTOS
			Analyze Multitasking, IPC and scheduling concepts
9.	20ECC209	Mini Project with Seminar	Familiarize in searching the suitable literature in the chosen field.
			Develop skills to understand and summarize the contents from the literature.
			Ability to synthesize knowledge/ skills previously gained and applied in execution of a chosen technical problem.
			Enhance oral presentation skills through power point presentations.
			Learn and present the findings of their technical solution in a written report.
10.	20ECC210	Industrial Project /Dissertation Phase I	Survey the literature such as books, national/international refereed journals and contact resource persons for the selected topic of research/project field.
			Consolidate the literature survey and will be motivated to define the title of the project, able to decide the aim(s), objectives and design specifications of the project.
			Learn the required software/ computational/analytical tools for implementations.
			Document a report comprising of summary of literature survey, detailed objectives, project specifications, or computer aided design, proof of concept/functionality, and part of results if any.
			Get aquatinted to work in a research environment or in an industrial environment
11.	20ECC211	Industrial Project /Dissertation Phase II	Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.
			Plan experiments for a critical comparison of outputs or to verify the obtained analytical/simulation results with the experimental results available in the literature.
			Develop attitude of lifelong learning and will develop interpersonal skills to deal with people working in diversified field.
			Learn to write technical reports and research papers to publish at national and international level.
			Develop strong communication skills to defend their work in front of technically qualified audience.
12.	20EC E201	Advanced Computer Organization	Analyze the computer arithmetic operations.
			Design of control unit of the computer
			Understand the memory organization of the computer
			nterface various I/O modules to the computer system
			Analyze the multiprocessor environment and various buses for the computer system

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13.	20EC E202	Communication Buses and Interfaces	Choose a particular serial bus suitable for a particular application.
			Develop APIs for configuration, reading and writing data onto serial bus.
			Design and develop peripherals that can be interfaced to desired serial bus.
			Understand the CAN architecture and its applications
			Analyze USB data transfers and descriptors and the PCI express technology
14.	20EC E203	Data Acquisition System Design	Understand the fundamentals of sensors, transducers and signal conditioning.
			Explain configuration of computer plugin I/O standalone and distributed loggers controllers.
			Demonstrate the Interface of the hardware for acquiring the data through systems
			Build the design flow for data acquisition system.
			Experiment with software tools to develop the code and implementation for data acquisition system.
15.	20EC E204	FPGA & CPLD Architectures	Explain the concepts of PLDs, CPLDs and FPGAs.
			Analyze and compare the various architectures of CPLD and FPGA and its programming technologies.
			Implement various logic functions on PLDs, CPLDs and FPGAs.
			Understand the concepts of placement and routing algorithms and classifying ASICs.
			Demonstrate VLSI tool flow for CPLDs and FPGAs.
16.	20EC E205	Low Power VLSI Design	Identify sources of power dissipation in a given VLSI Circuit
			Analyze and apply various low power circuit techniques for combinational and sequential circuits
			Demonstrate understanding of clock distribution for Low Power
			Explain power minimization techniques for arithmetic and memory subsystem
			Elaborate Microprocessor Design System concepts for Low Power
17.	20EC E206	Nano-materials and Nanotechnology	Understand the basic electrical and optical, magnetic, mechanical properties of nano materials.
			Construct devices based on nano materials.
			Explain nano fabrication steps, fabrication and applications of MEMS.
			Construct Nano structures like Carbon nano tubes and MEM actuators.
			Discuss various procedures of nano composites and applications of nano biomaterials.
18.	20EC E207	Network Security and Cryptography	Identify and utilize different forms of cryptography techniques.
			Analyzesolutionsforeffectivekeymanagementanddistributionandconductcryptanalysis
			Predict Encryption and decryption of data using Symmetric key and Asymmetric ciphers
			Assess authentication and security in the network applications.
			Interpret different types of threats to the system and handle the same.
19.	20EC E109	Pattern Recognition and Machine Learning	Understand the concepts of pattern recognition.
			Apply the parametric and linear models for classification.
			Design algorithms using neural networks for machine learning problems.
			Implementation of Support Vector Machines (SVM) algorithm for real time applications.
			Evaluate various unsupervised clustering techniques.
	20EC E208	Programming	Develop embedded C application of moderate complexity.

20.		Languages for Embedded Software	Build the Object-Oriented approach to software that models application and Develop algorithms in C++.
			Understand the overloading and Inheritance concepts of programming.
			Assess the exceptions of the error code.
			Differentiate interpreted languages from compiled languages.
21.	20EC E209	RF IC Design	Define and understand the characteristics RF systems, Tuned circuits, LNA, Mixers.
			Understand the behavior of RF systems, Reflection Coefficient and Noise in the MOS device.
			Apply the concepts noise and to characterize the amplifiers.
			Analyze different Power Amplifiers at RF range; design different LNA Configuration, Power Amplifiers.
			Design and Develop a PLL for the given specifications.
22.	20EC E210	SoC Design	Understand the conceptsrelated to SoC like NISC, ASIP, ADL, GNR, Reconfiguration, Clock Gating, DVS etc.
			Differentiate between various design strategies like ASIC and SOC etc.
			Distinguish between various types of Processors like CISC, RISC, NISC and ASIP.HDL and ADL
			Design a simple SOC for reconfigurability / low power / ASIP / NISC etc. and synthesize simple blocks using Graph Theory.
			Simulate and synthesize the Design using various simulation models.
23.	20EC E211	System Design with Embedded Linux	Understand the importance of Embedded Linux in system design
			Analyze the architecture of embedded Linux in detail
			Explain the Linux BSP for a hardware platform
			Develop and Debug the drivers in Embedded Linux
			Apply the concepts of µC Linux to system design
24.	20EC E212	VLSI Signal Processing	Understand the concepts of various DSP algorithms, its DFG representation, pipelining and parallel processing approaches
			Demonstrate retiming techniques and systolic architecture design concepts
			Develop various convolution algorithms for programmable hardware.
			Evaluate pipelining and parallel processing techniques in the design of recursive digital filters
			Discuss algorithmic strength reduction techniques and evolution of DSP processors.
25.	20EC E213	VLSI Technology and Physical Design Automation	Explain various technology aspects of VLSI Physical design.
			Demonstrate CMOS IC fabrication process
			Apply Design rules in the construction of layouts of a given design.
			Choose appropriate Automation algorithm for partitioning, floor planning, placement and routing.
			Identify EDA/CAD tools for Automation of VLSI Physical design automation.
26.	20ECE114	Wireless Sensor Networks	Recall the Network Architecture, hardware details, programming tools, Protocols and Special feature of WSN.
			Demonstrate hardware and Programming Tools for Performance comparison of wireless sensor networks simulation and experimental platforms
			Analyze Sensor Network Protocols and Security Challenges, Sensor deployment mechanisms.
			Identify open issues for future research, and enabling technologies in wireless sensor network
			Design wireless sensor network system for different applications under consideration.
27.	20ME M103	Research Methodology and IPR	Define research problem, review and asses the quality of literature from various sources
			Improve the style and format of writing a report for technical paper/ Journal report, understand and develop various research designs
			Collect the data by various methods: observation, interview, questionnaires

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28.	20CE A101	Disaster Management	Analyze problem by statistical techniques: ANOVA, F-test, Chi-square
			Understand apply for patent and copyrights
			Ability to analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at different levels
			Ability to understand and choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan
			Ability to understand various mechanisms and consequences of human induced disasters for the participatory role of engineers in disaster management
			Understand the impact on various elements affected by the disaster and to suggest and apply appropriate measures for the same
			Develop an awareness of the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans and ability to understand variousparticipatory approaches/strategies and their application in disaster management
29.	20EG A101	English for Research Paper Writing	Illustrate the nuances of research paper writing and draw conclusions about the benefits and limitations of research.
			Classify different types of research papers and organize the format and citation of sources.
			Review the literature and categorize between different types of research.
			Draft paragraphs and write thesis statement in a scientific manner.
			Develop an original research paper while acquiring the knowledge of how and where to publish their papers.

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30.	20EG A102	Indian Constitution and Fundamental Rights	Understand the making of the Indian Constitution and its features.
			Understand the Rights of equality, the Right of freedom and the Right to constitutional remedies.
			Have an insight into various Organs of Governance - composition and functions.
			Understand powers and functions of Municipalities, Panchayats and Co-operative Societies.
			Understand Electoral Process, special provisions.
31.	20IT A101	Pedagogy Studies	Illustrate the pedagogical practices followed by teachers in developing countries both in formal and informal classrooms.
			Examine the effectiveness of pedagogical practices
			Understand the concept, characteristics and types of educational research and perspectives of research
			Describe the role of classroom practices, curriculum and barriers to learning.
			Understand Research gaps and learn the future directions.
32.	20EG A104	Personality Development through Life Enlightenment Skills.	Develop their personality and achieve their highest goal of life.
			Lead the nation and mankind to peace and prosperity.
			To practice emotional self-regulation.
			Develop a positive approach to work and duties.
			Develop a versatile personality.
33.	20EE A101	Sanskrit for Technical Knowledge	Develop passion towards Sanskrit language
			Decipher the latent engineering principles from Sanskrit literature
			Correlates the technological concepts with the ancient Sanskrit history.
			Develop knowledge for the technological progress
			Explore the avenue for research in engineering with aid of Sanskrit
34.	20EG A103	Stress Management by	Understand yoga and its benefits.

		Yoga	Enhance Physical strength and flexibility.
			Learn to relax and focus.
			Relieve physical and mental tension through asanas
			Improve work performance and efficiency.
35.	20EC A101	Value Education	Summarize classification of values and values for self-development.
			Identify the importance of values in personal and professional life.
			Apply the importance of social values for better career and relationships.
			Compile the values from holy books for personal and social responsibility.
			Discuss concept of soul and reincarnation, values Dharma, Karma and Guna.
	20CS O101	Business Analytics	Identify and describe complex business problems in terms of analytical models.
			Apply appropriate analytical methods to find solutions to business problems that achieve stated objectives.
			Interpret various metrics, measures used in business analytics
			Illustrate various descriptive, predictive and prescriptive methods and techniques
			Model the business data using various business analytical methods and techniques
			Create viable solutions to decision making problems
37.	20ME O103	Composite Materials	Classify and characterize the composite materials.
			Describe types of reinforcements and their properties.
			Understand different fabrication methods of metal matrix composites.
			Understand different fabrication methods of polymer matrix composites
			Decide the failure of composite materials.
38.	20CE O101	Cost Management of Engineering Projects	Acquire in-depth knowledge about the concepts of project management and understand the principles of project management.
			Determine the critical path of a typical project using CPM and PERT techniques.
			Prepare a work break down plan and perform linear scheduling using various methods.
			Solve problems of resource scheduling and levelling using network diagrams.
			Learn the concepts of budgetary control and apply quantitative techniques for optimizing project cost.
39.	20ME O101	Industrial Safety	Identify the causes for industrial accidents and suggest preventive measures for safety.
			Understand the basic need and requirements of different maintenance procedures.
			Apply different techniques to reduce and prevent wear and corrosion in industry.
			Analyze different types of faults present in various equipments like machine tools, IC engines, boilers etc.
			Formulate a plan for periodic and preventive maintenance techniques as required for industrial equipments like motors, pumps and air compressors.
40.	20ME O102	Introduction to Optimization Techniques	Build and Solve the linear programming problems.
			Solve the given transportation problem.
			Analyze project management techniques like CPM and PERT to plan and execute projects successfully.
			Compare various inventory control techniques.
			Apply sequencing and queuing theory concepts for industry applications
41.	20EE O101	Waste to Energy	Understand the concept of conservation and Identify the devices for conservation
			Classify the different forms of wastage
			Explain the process of Gasification, Demonstrate the design and

				operation of Gasifiers
				Explain the process of Combustion, Demonstrate the construction and operation of various combustors
				Describe the process of biomass conversion and to Differentiate biomass, biogas, biochemical and biodiesel plants

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