



CVR COLLEGE OF ENGINEERING

(An UGC Autonomous Institution with NAAC 'A' Grade Affiliated to JNTUH)

Vastunagar, Mangalpalli (V), Ibrahimpatan (M), R.R. District

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

M. Tech. Embedded Systems R-18 Regulation Course Outcomes

M. Tech. I Year I Semester			
Course Code	Course Title	CO No.	Course Outcome
73101	Programming for Embedded Systems	CO1	Program 8051 based embedded system
		CO2	Compare and select ARM processor core based SoC with several features peripherals based on requirements of embedded applications
		CO3	Understand embedded C programming techniques
		CO4	Develop small applications by utilizing the ARM processor core
		CO5	Implement Different Microcontroller Interfaces
73102	Operating Systems for Embedded Design	CO1	Understand low level hardware of computer system with instruction execution
		CO2	Understand file system and customize the blocks desired for an embedded system
		CO3	Inter-process communication problems will be solved and various scheduling algorithms will be developed for synchronization.
		CO4	Understand and program scheduler for periodic and aperiodic task structure
		CO5	Understand different RTOS in embedded systems
73103	Embedded System Design	CO1	Understand low level hardware of computer system with instruction execution
		CO2	Learn the processing elements used in embedded systems
		CO3	Understand embedded firmware
		CO4	Knows the use of RTOS in embedded systems
		CO5	Learn different task communication techniques in RTOS
73104	Python Programming	CO1	Learn basic syntax, data types and write simple programs
		CO2	Develop scripts for handling complex data
		CO3	Utilize the standard library modules for various applications
		CO4	Understand object-oriented programming and file handling in Python
		CO5	Understanding various web frameworks and GUI programming
73105	VLSI Technology and Design	CO1	Review FET fundamentals for VLSI design
		CO2	Design, draw the layouts of all logic gates & various MOSFET's by using scalable design rules
		CO3	Know the methods to find delays, power utilized by using methods of testing
		CO4	Design different memory cells & arrays, finding different faults by conducting different testing methods
		CO5	Design the subsystems based on VLSI concepts
73106	Wireless Communications	CO1	Understand the fundamentals of mobile and cellular communications system design and cell capacity
		CO2	Understand the large-scale path loss in mobile radio propagation
		CO3	Model the fading effects in multi path environment
		CO4	Understand different types of equalizers and diversity techniques
		CO5	Analyze the performance of modulation techniques for mobile radio
73107	Advanced Computer Architecture	CO1	Understand the fundamentals necessary for computer design
		CO2	Learn and understand the concept of instruction format, instruction set and pipelining

		CO3	Know what instruction level parallelism is and to know its existence with respect to hardware and software
		CO4	Understand the multiprocessors and shared memory architecture
		CO5	Understand the inter connection networks and intel architecture
73108	CPLD and FPGA Architectures and Applications	CO1	Understand the difference between FPGA and CPLD architectures
		CO2	Understand all types of FPGA interconnecting technologies
		CO3	Know different FPGA vendors architecture and their applications
		CO4	Develop the capability of logic expression using Anti fuse FPGA such ACTEL FPGAs
		CO5	Design Counters, Accumulators and other applications using FPGA technology
73109	Image and Video Processing	CO1	Understand the representation of the digital image, identification of threshold for an image and segmentation of image.
		CO2	Understand the spatial domain and frequency domain image enhancement techniques.
		CO3	Understand the redundancy in images and various image compression techniques
		CO4	Understand the representation of video and sampling of video signals
		CO5	Learn the basic principles of Motion estimation from the video
78101	Research Methodology and IPR	CO1	Understand research problem formulation and analyze research related information
		CO2	Follow research ethics
		CO3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
		CO4	Understanding importance of intellectual property rights
		CO5	Understand the importance of patent rights and developments in IPR
73131	Embedded Programming Lab (Lab – I)	CO1	Program for Interfacing different I/O devices with Embedded boards
		CO2	Develop and application using 8051 Microcontroller
		CO3	Install, configure, and utilize tool sets for developing applications based on ARM processor core
		CO4	Develop prototype codes using commonly available on and off chip peripherals on the Cortex M3
		CO5	Develop small applications by utilizing the ARM processor core
73132	Operating Systems Lab (Lab – II)	CO1	Do programming with Linux editor and shell commands
		CO2	Familiar of the embedded Linux development model
		CO3	Write, debug, and profile applications and drivers in embedded Linux and RTOS
		CO4	Understand and create Linux BSP and RTOS for a hardware platform
		CO5	Understand General OS and RTOS programs
M. Tech. I Year II Semester			
73201	System On Chip Architectures	CO1	Understand the basic level of the system on chip processor and architectures
		CO2	Design System on Chip for different processors
		CO3	Explore different types of memory architectures
		CO4	Acquire knowledge of different internal bus architectures
		CO5	Understand AES algorithm and JPEG compression implementation in SoC
73202	Hardware Software Co-Design	CO1	Study the need of different target architectures and co-design to solve engineering, communication, and other problems
		CO2	Analysis and extension of existing compilers and languages to system level co-design models for creation and using of modern tools
		CO3	Design mixed hardware-software and the design of hardware-software interfaces
		CO4	Focus on common underlying modeling concepts and the trade-offs between hardware and software components

		CO5	Learn about System-level specification, design representation for system level synthesis, system level specification languages
73203	Communication Buses and Interfaces	CO1	Select a particular serial bus suitable for a particular application
		CO2	Develop APIs for configuration, reading and writing data onto serial bus
		CO3	Design and develop peripherals that can be interfaced to desired serial bus
		CO4	Understand wired and wireless communication protocols, its formats
		CO5	Understand the protocols of USB and its interface with the microcontroller. Gain knowledge of wireless sensors and their application in wireless embedded networks.
73204	Building Internet of Things	CO1	Develop more understanding on the concepts of IOT and its present developments
		CO2	Students will study about different IOT technologies
		CO3	Acquire knowledge about different platforms and Infrastructure for IOT
		CO4	Apply concepts of data analytics to IoT and understanding big data.
		CO5	Learn case studies in IoT
73205	Reconfigurable Computing	CO1	Understand reconfigurable computing and its architectures
		CO2	Understand FPGA design flow and high-level synthesis
		CO3	Understand temporal placement and online communications between modules
		CO4	Understand partial reconfiguration design and system on a programmable chip
		CO5	Study applications of reconfigurable computing and to take up case studies
73206	Digital Signal Processors and Architectures	CO1	Design, using MATLAB-based filter design techniques, FIR and IIR digital filters
		CO2	Program and debug real-time signal processing algorithms in assembly language on a digital signal processor
		CO3	Multidisciplinary teams, identify a useful DSP application, and then plan, design, implement and verify for a digital signal processor
		CO4	Give an overview of entire digital signal processing techniques i. e. convolution, DFT, FFT, IIRFIR filters, the fixed and floating-point representation, different types of errors introduced during A-D and D-A converter stage
		CO5	Introduce the DSP computational building blocks and special types of addressing modes compared to normal microprocessor
73207	Human Computer Interaction	CO1	Understand the guidelines influencing human computer interaction
		CO2	Describe typical human-computer interaction (HCI) models
		CO3	Analyze and identify stakeholder requirements of HCI systems
		CO4	Understand the structure of mobile systems
		CO5	Design an interactive web interface on the basis of models studied
73208	Digital System Design	CO1	Minimize and design of the Finite state machines
		CO2	Understand the design of digital circuits using RAM, ROM and PLD.
		CO3	Understand data path, control unit, micro-operation and building block of digital system
		CO4	Apply test pattern for the detection of logical fault
		CO5	Know the concepts of test generation for combinational and sequential circuits
73209	Software Defined Radio	CO1	To learn the software radio and its importance
		CO2	To understand the techniques to improve data conversion performance
		CO3	To understand the difference between ideal and practical converters
		CO4	To acquire the knowledge of digital hardware architectures and its development methods
		CO5	To understand the object-oriented representation for radios and the analysis of various case studies
73231	Programmable SoC Lab	CO1	Learn PSoC Programmer
		CO2	Program first touch kit of PSoC
		CO3	Program and Interface Analog and Digital I/Os
		CO4	Understand the FPGA programming using Lab View software

		CO5	Understand Xilinx design environment
73232	Advanced Microcontrollers Lab	CO1	Program Raspberry Pi 2 based embedded system
		CO2	Perform Different Programs using Raspberry Pi 2
		CO3	Understand embedded C programming techniques
		CO4	Develop small applications by utilizing the beagle bone processor core
		CO5	Implement Different Microcontroller Interfaces in UAVs
73233	Technical Seminar	CO1	Collection and review of research material form literature.
		CO2	Analysis of concepts in multidisciplinary research areas.
		CO3	Preparation and presentation of technical topics with good communication skills.
M. Tech. II Year I Semester			
73301	Microcontrollers for Embedded Systems	CO1	Identify and understand the basics of different microcontrollers
		CO2	Examine the architecture and registers of AVR microcontrollers
		CO3	Identify and understand the function of different blocks of PIC microcontroller
		CO4	Develop programs for PIC microcontroller using Assembly language
		CO5	Interface 7 segment LEDs, LCD, and Keyboard with PIC microcontroller
73302	Soft Computing Techniques	CO1	Implement genetic algorithm like tabu search and Ant-colony search techniques
		CO2	Have basic idea about Artificial Neural Networks
		CO3	Learn about Fuzzy Logic System in Artificial Neural Networks
		CO4	Implementation of Genetic Algorithm
		CO5	Students have basic idea about GA application to power system, MATLAB neural networks toolbox
73303	Sensors and Actuators	CO1	Gain knowledge to interface various sensors and actuators in embedded applications
		CO2	Learn about sensor Principles, Classification, Parameters, Characteristics, Environmental Parameters (EP), and Characterization
		CO3	Know about different sensors like Thermal sensors, Magnetic sensors
		CO4	Know about Smart Sensors, Introduction, Primary Sensors, Excitation, Amplification, Filters, Converters, Compensation
		CO5	Information Coding/Processing, Data Communication, Standards for Smart Sensor Interface and the Automation
78301	Business Analytics	CO1	Students will demonstrate knowledge of data analytics
		CO2	Students will demonstrate the ability of thinking critically in making decisions based on data and deep analytics
		CO3	Students will demonstrate the ability to use technical skills in business analytics and predictive analysis
		CO4	Student will be able to understand various forecasting and simulation models
		CO5	Students will demonstrate the ability to translate data into clear, actionable insights and learn decisions strategies
78302	Industrial Safety	CO1	To analysis various industrial hazards.
		CO2	To implement maintenance tools and techniques in manufacturing industry.
		CO3	To use teratology concepts in manufacturing industry.
		CO4	To diagnose industrial equipment's like air pump, compressors etc.
		CO5	To design a preventive maintenance schedule for mechanical components in manufacturing industry.
78303	Operations Research	CO1	Apply the dynamic programming to solve problems of discreet and continuous variables.
		CO2	Apply the concept of non-linear programming
		CO3	Carry out sensitivity analysis
		CO4	Model the real world problem and simulate it.
		CO5	Solve the real time problem using Linear programming problem techniques.

78304	Cost Management of Engineering Projects	CO1	Understand the parameters involved in the strategic cost management process
		CO2	Comprehend the technical and non-technical activities involved in the Project Management
		CO3	Understand the relation between project planning and cost analysis
		CO4	Understand different types of budgets and application in Civil Engineering projects
		CO5	Understand different costing methods and valuation techniques for different projects
78305	Composite Materials	CO1	Students will demonstrate the knowledge of reinforcement, & composite performance
		CO2	Students will demonstrate the different fibers & mechanical behavior of composites
		CO3	Students will demonstrate knowledge of manufacturing of various metal matrix composites
		CO4	Students will demonstrate the manufacturing of polymer matrix composites
		CO5	Students will demonstrate the knowledge of stress, maximum strain & failure criteria
78306	Energy From Waste	CO1	Understand the types of various energy conversion units from waste
		CO2	Get the knowledge on the solid waste disposal techniques
		CO3	Understand the biochemical conversion of various residues
		CO4	Familiarize about the step-by-step process of Biogas Conversion
		CO5	Understand E-waste Management in India
73304	Seminar On Project Work	CO1	Collection and review of research material from literature
		CO2	Analysis of concepts in multi-disciplinary research areas
		CO3	Preparation and presentation of technical topics with decent communication skills
73305	Project Work Phase - I	CO1	Apply knowledge to propose solutions to the multi domain and real time systems
		CO2	Perform data collection, review research literature and project management
		CO3	Use modern EDA tools and research knowledge for developing cost effective systems
		CO4	Develop presentation and communication skills
M. Tech. II Yr II Semester			
73401	Project Work Phase - II	CO1	Apply knowledge to propose solutions to the multi domain and real time systems
		CO2	Perform data collection, review research literature and project management
		CO3	Use modern EDA tools and research knowledge for developing cost effective systems
		CO4	Develop presentation and communication skills