VASAVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Embedded System Design

[2020 – 2021]

Faculty: **N Abid Ali Khan**	Program: ME	Branch: **ESVLSID**		SEE Marks: **60**	Course Code: **PI20PC110EC**
L: T: P (Hr/week): **3:0:0**	Year: **First**	Sem – **I**	Credits: **3**	CIE Marks: **40**	Duration of SEE: **3 Hours**

COURSE OBJECTIVES	COURSE OUTCOMES
1. Implement embedded hardware & firmware using embedded-C for C51 to interface with different I/O. 2. Demonstrate the embedded system design using ARM IP core with emphasis on its programming model. 3. Interpret serial and parallel bus communication protocols used for providing connectivity and propose debugging techniques for testing.	On completion of the course, students will be able to 1. Define, Classify and Analyze embedded system product design with IC Technology. 2. Design & implement device drivers in embedded-C for C51 target MCU to interface I/O. 3. Analyze ARM IP Core usage in design with its programming model. 4. Justify the hardware software codesign issues along with debugging techniques. 5. Propose serial & parallel protocols to design networked embedded systems.

UNIT	Contents	Lectures	Remarks
Unit–1	Embedded Systems Overview: Definition of Embedded System; Examples; Design Challenges–Optimizing Design Metrics; Selection of processor or controller & memories; Processor Technology; RISC Vs CISC	05	
Unit–2	Real World Interfacing using Embedded C with AT89S52 (8051 Microcontroller): ADC0808, LED, Seven Segment Displays, DAC, LCD, Keypad, RTC, DC Motor, Stepper Motor driving actuators using PWM.	09	
Unit–3	ARM Core Architecture: Introduction to RISC concepts with ARM as CPU, ARM engine Architecture, AMBA Bus, Core Registers, Programming Modes, Importance of Thumb Mode, CPSR, SPSR, Pipeline, Exceptions, Interrupts, and vector table; ARM Programming Model; Core Extensions, ARM Revisions, ARM processor families and comparisons.	08	
Unit–4	Embedded Networking: Serial protocols topology & working principles and frame formats – I 2C; SPI; USB; CAN; Ethernet; Parallel Protocols – PCI; PCIx; AMBA bus	09	
Unit–5	Embedded Debugging Techniques: Debugging Methods using Software and Hardware; usage of JTAG adaptor for ARM and Embedded ICE Embedded Software Architectures Introduction: Round-Robin; RR with Interrupt; Functional Queue Scheduling & need of RTOS.	07	

Total: **38**

Number of Contacting Lecture Hours: **38Hrs. +** Number Hours falling for CIE – 05**Hrs.**

= Total Number of Contact Hours in the Semester – **43Hrs.**

Signature of The Faculty	**Signature of The Head**	**Signature of The Principal**
Mr. N Abid Ali Khan	Dr. E Sreenivasa Rao	Dr. S V Ramana
Asst Prof – ECE; VCE(A)	Prof & Head – ECE; VCE(A)	Vasavi College of Engineering (A)