GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 2

Computer Science & Engineering

Subject Name **Major Elective III- Embedded Systems**

Sr.No	Course content
1.	Introduction -Embedded Systems Overview, Design Challenge — Optimizing Design Metrics, Processor Technology, IC Technology, Design Technology, Trade-offs
2.	Custom Single-Purpose Processors: Hardware- Introduction, Combinational Logic, Sequential Logic, Custom Single-Purpose Processor Design, RT-Level Custom Single-Purpose Processor Design, Optimizing Custom Single-Purpose Processors
3.	General-Purpose Processors: Software- Introduction, Basic Architecture, Operation, Programmer's View, Development Environment, Application-Specific Instruction-Set Processors (ASIPs), Selecting a Microprocessor, General-Purpose Processor Design,
4.	Standard Single-Purpose Processors: Peripherals- Introduction, Timers, Counters, and Watchdog Timers, UART, Pulse Width Modulators, LCD Controllers, Keypad Controllers, Stepper Motor Controllers, Analog-to-Digital Converters, Real-Time Clocks
5.	Memory – Introduction, Memory Write Ability and Storage Permanence, Common Memory Types, Composing Memory, Memory Hierarchy and Cache, Advanced RAM
6.	Interfacing – Introduction, Communication Basics, Microprocessor Interfacing: I/O Addressing- Interrupts and Direct Memory Access, Arbitration, Multilevel Bus Architectures, Advanced Communication Principles, Serial Protocols, Parallel Protocols
7.	Digital Camera Example- Introduction, Introduction to a Simple Digital Camera, Requirements Specification, Design
8.	The 8051 Microcontrollers- Microcontrollers & Embedded Processors, Overview of 8051 family, Real World Interfacing
9.	8051 Assembly Language Programming- Inside the 8051, Introduction to 8051 Assembly Programming, Assembling and running 8051 Program, The Program Counter and ROM space in the 8051, Data Types and Directives, 8051 flag bits and the PSW register, 8051 register banks and stack

Reference Books:

1. Embedded System Design: A Unified Hardware / Software Introduction By Frank Vahid and Tony Givargis, (WILEY-INDIA III Edition)
2. The 8051 Microcontroller and Embedded Systems : Using Assembly and C By M.A. Mazidi, J.G. Mazidi & R.D. McKinlay (Pearson Education II Edition)
3. Embedded Systems: Architecture, Programming And Design By Raj Kamal (TMH Publication II Edition)
4. Hardware Software Co -design: Principles and Practice By Jorgan Syaunstrup and W.Wolf (Springer, 1997)
5. Programming Embedded Systems in C and C++ By Michael Barr, (O'Reilly Media, 1999)