VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. (I.T.) [Five Years Integrated Course]
M.Sc. (Information Technology)
2nd Semester Syllabus

Effective From July-2003

Paper No : 804
Paper Title : Elective – II – Embedded Systems.

[L : 4, P : 0 Hrs]

1. **Introduction.**
   Embedded systems Introduction: Processor Technologies, Implementation Technologies, and general design technologies.
   General purpose processors and the 8051, development environment.
   System on a chip trends, Hardware and Software requirements.
2. **Microcontrollers.**
   Different types of microcontrollers, Embedded Microcontrollers, Processor architecture, Memory types, Microcontroller features.
3. **Hardware Design.**
   Single chip design, Multiple chip designs, Processor core, Memory devices, SRAM, DRAM, flash Memory and SDRAM controller, types of PROM, memory management.
4. **On chip Design,**
   Busses, access arbitration, timing and protocols, In circuit programming, Internal Peripherals, EMC considerations, Microprocessor clocks, designing custom processors (combinational logic design, sequential logic design, custom processor design.)
5. **Interrupts & Timers.**
   Various types of Interrupts, Interrupts priority, ISR, DMA, timers and counters, Watchdog timer.
6. **Serial Communication.**
   UART, SPI and I2C, Parallel I/O interface and signal handshaking.
7. **Real world Interfacing.**
   Transducers and Sensors, touch Panel, A/D – D/A converters, Keyboards, LCD, VGA Interfaces.
8. **Real time Operating systems.**
   Multitasking Memory management, Resource Management, RTOS & Interrupts, Applicability of RTOS.
9. **Embedded system Design & Application.**
   PWM motor control, Aircraft control, Remote operation control with an Infrared TV remote control, Light Sensors & Robot.
10. **Embedded Software.**
    Design goals for Embedded Softwares, choosing language for programming, Data representations, tools available.

Main Readings :

1. The 8051 Microcontroller & Embedded Systems, Muhammad Ali Mazidi, Pearson Education.
2. Programming & Customizing the 8051 Microcontroller. Myke Predko, TMH Edition 1999.
3. Embedded Microprocessor Systems : Real World Design. Stuart R. Ball, 3rd Edition, Newnes Publications.
4. Fundamentals of Embedded software where C and Assembly meet. Daniel Levis, Pearson Education.