



C-DAC & Gujarat Technological University
M.E. Electronics & Communication Engineering
(VLSI & Embedded Systems Design)
Gandhinagar

Semester – II

2725202: Protocols and Interfaces

UNIT I - Introduction (Recap)

Basic concepts of computer organization. The stored program model. Classes of computer architecture. Processor vs. System architecture. Elements of computer systems – processors, memories, I/Os, disks, buses

UNIT II - Data Processing in Microcontrollers

Programs based on data transfer, arithmetical, logical, branching, bit (Boolean) operation instructions.

UNIT III - Organization communications of Microcontroller with the object of control

Data Transfers between On-chip hardware Microcontroller and peripheral Units. Signal processing and conditioning. Timing Function conditioning. Software conversion of codes. Software support of A/D and D/A Converters

UNIT IV - Interfacing with Microprocessor Systems

Organization communications of Operator with Microcontroller. Keyboard and Display interfacing. Input/ output enhancement mode

UNIT V- Protocols

Types of memory interfaces – SRAM, DRAM, Flash, EPROM/ROM and corresponding protocols.

Types of Disk protocols – SATA, IDE, SCSI

Special memories – Video RAMs, RDRAM, CAM

Interrupt controllers, priorities and arbitration. ISRs and context saving architectures. Programmable interrupt controller PCI, USB, 1394, Ethernet, 802.11x, PCI Express, ACPI Bridge functions Storage area networks and protocols

Labs:

Tools used during laboratory works: Linux, Perl, Gcc, Gdb, VCS

- Study and implementation of interfacing exercises.
- Study and implementation of performance of memory systems and their impact on system performance
- Study and implementation of Standard interfaces

Course Project:

A project of suitable complexity, comprising of program design, coding, compilation and debug must be completed.

**References:**

1. Computer Architecture, A Quantitative approach by D.Patterson and J. Hennessy
2. Computer Organization by D. Patterson and J.Hennessy
3. Bus Specifications - PCI, PCIe, SCSI, IDE, USB, 802.11x, SATA