

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Syllabus for F Y B Sc (Computer Science)
w.e.f June 2010

Electronics Paper: 1: Basic Computer Hardware Digital Electronics

Data Representation and Code:

Number system, Decimal, binary and hexadecimal number system and their arithmetic (Add and Subtract), introduction to ASCII and BCD codes, error detecting and correcting codes (Parity, and Hamming code), negative representation (1's and 2's complement) and basic of its arithmetic, Representation of Floating point numbers,

Introduction to logic Gates, basic logic gates (AND, OR, NOT), De Morgan's Theorem (using truth table only), Universal logic Gates (NAND & NOR), XOR gate and its applications.

Semiconductor Memory:

Types of semiconductor memories, concept, operation and structure of organization (address-data lines, chip select-enable line requirement) of memory, PC Memory, memory chips and modules, different memory packages, parity and ECC, internal organization of memory chips, different types of memory RAM, ROM, NVRAM, Cache memory, RAM bus and addressing memory, logical, segmented virtual, linear and physical memory address

Data Storage Techniques:

Diskette drives, structure and working Hard disk drive, logical structure of DOS disk and its overview, file format ASCII and Non-ASCII files, master boot recode and partitions, multiple disk drives, SMART and RAID drives, architecture of SCSI and IDE disk drives, optical data storage devices and techniques for reading and writing onto the optical devices, disk utilities, data compression,

Input and Out put Devices:

Basics of Keyboard, pointing device mouse and types of mouse, PC input devices like scanner, FAX modem, camera, biometric devices, display system, image and colour adjustment, Video display, understanding and technology of CRTs, LCDs, PC Printers, impact and non-impact printers, Laser and ink jet printers, IO Interfaces serial ports UART, USB ports, serial and parallel port address, keyboard interfaces

Data Transfer Technique:

General IO interfaces IO buses, ISA PC IO bus, PCI bus, AGP Video, high speed serial buses

Book:

- 1) Peter Norton, Inside the PC, 8th Ed., Techmedia
- 2) D Jinwala, B C Patel, Fundamentals of Computer and programming, Benison Education
- 3) A Anand Kumar, Fundamentals of Digital Circuits, PHI, New Delhi

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT**F Y B Sc (Computer Science)****Electronics Paper: 2: Computer Architecture & Microprocessors****8086 ARCHITECTURE AND PROGRAMMING MODEL:**

Functional block diagram of computer, Introduction to microprocessor, History of Microprocessor and generations, Pin description of 8086, 8086 architecture

8086 ADDRESSING MODES:

Immediate addressing, Register addressing, Memory addressing modes, Memory addressing modes as derivatives of Based Indexed addressing with displacement, I/O port addressing

INSTRUCTION TEMPLATES

Template for data transfer between a Register and Register / Memory, Code generation using template

DATA TRANSFER INSTRUCTIONS

Move data to a Register / Memory from a Register / Memory / Immediate data, Data transfer between a Segment register and a Register / Memory location, PUSH and POP instructions, Exchange instructions, Data transfer with I/O ports

DATA CONVERSION INSTRUCTIONS

Translate the value in AL, Load EA of a memory location into a register, Load register and the segment register DS and ES with content of memory words, XLAT, LEA, LDS, LES, LAHF, SAHF instructions

ARITHMETIC INSTRUCTIONS

Add and Subtract group of instructions, Negate instructions, Compare instructions, Data size conversion instructions, Multiply and Divide instructions

LOGICAL INSTRUCTIONS

AND, OR, Ex-OR, TEST, NOT, Rotate and Shift instructions

PROCESS CONTROL INSTRUCTIONS

Instructions to Set / Reset flags, Halt and Wait instruction, Lock Prefix, Escape to co-processor

STRING INSTRUCTIONS

String instruction regarding Moving, Storing, Loading, Comparing and Scanning the string

MOVS, STOS, LODS, CMPS and SCAS instructions

BRANCH INSTRUCTIONS:

Conditional Jumps based on a single and multi flag condition,

Unconditional jump instruction,

Iteration, Call and Return instructions.

ASSEMBLY LANGUAGE PROGRAM:

Introduction, Problem of multi byte addition and subtraction, Approach methodology, Explanation of Assembler directives, Conventions used in writing comments in the program, Program working, Keying in the program, Assembling the program, Linking of the program, Testing of the program, Running the entire program in a single operation, Running the program in single step operation, Stepping through the program several instructions at a time, Assembly language programs without using the .MODEL directive Computation of LCM, GCD of four numbers, Computation of factorial.

Recommended Books:

- 1) K Uday Kumar and B S Umashankar, Advanced Microprocessors & IBM-PC Assembly Language Programming, TMH, New Delhi.
- 2) Liu Gibsson Microprocessor Architecture & Programming
- 3) D Hall. Advance Microprocessor

List of Experiments for F Y B Sc (Computer Science):

Group – I

- 1) Study of Basic Logic gates.
- 2) Study of Universal logic gates.
- 3) Study of XOR and XNOR gate.
- 4) Study of parity bit generator.
- 5) Study of parity bit detector.
- 6) Study of controlled inverter.
- 7) Study of digital comparator.
- 8) Study of Computer assembling.
- 9) Study of Hard disk and its structure.
- 10) Study of Hard disk formatting and installation of operating system (Windows and LINUX) and various drivers.
- 11) Study of booting the system using USB port.
- 12) Study of various add-on/plug-in cards.
- 13) Study of mother-board and installation of various device drivers.
- 14) Study of edit of various registry areas.

Group – II

- 1) Write assembly language program to add/ subtract two multi byte signed numbers.
- 2) Write assembly language program to find the average of two numbers.
- 3) Write assembly language program to demonstrate backward JMP and forward JMP.
- 4) Write assembly language program to initialize the stack segment and stack pointer.
- 5) Write assembly language program to create a new stack area after saving the address of old stack area.
- 6) Write assembly language program to compute factorial of numbers between 1 and 9.
- 7) Write assembly language program to move byte from source string to destination string until all bytes are moved.
- 8) Write assembly language program without using .MODEL Directive.
- 9) Write assembly language program for computing LCM.
- 10) Write assembly language program for computing GCD of four numbers.
- 11) Write assembly language program to add N numbers of 4-digit BCD(16-bits) numbers and store the result in word location SUM.
- 12) Write assembly language program for sorting a given set of 16-bit or 8-bit signed numbers in ascending/ descending order.
- 13) Write assembly language program to find the largest/smallest number from set of 16-bit signed numbers and store the result at location BIG/SMALL.