CBCS -Syllabus

Computer Hardware

B.Sc. (M.Ch.Cs.)

(For the Students admitted in 2015-16 &onwards)

Department of Physics

Nizam College (Autonomous)

Osmania University

Hyderabad – 500 001

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NIZAM COLLEGE (AUTONOMOUS)

CBCS Pattern for Undergraduate B.Sc. Program

Semester	Courses	Hours per week	Duration of Exam Hrs	Marks			No. of Credits
				Internal	External	Total	
SEM-I	**Theory**						
	DSC-IA: Digital Circuits and Combinational Logic**(**Paper-I)	4	2	10	40	50	4
	Practicals						
	DSC-IA: Digital electronics Lab-(Paper-I)	3	2		25	25	2
SEM-II	**Theory**						
	DSC-IB: Digital design(Paper-II)	4	2	10	40	50	4
	Practical						
	DSC-IB: Digital Design Lab(paper II)	3	2		25	25	2

SEM III	**Theory**						
	DSC-IC: Microprocessor Architecture, Programming and Applications with the 8085(Paper-III)	4	2	10	40	50	4
	Practicals						
	DSC-IC: Microprocessor-8085 Lab (Paper-III)	3	2		25	25	2

SEM IV	Theory	Hrs/ week	Duration of exam hrs	Int. Marks	Ext. Marks	Total marks	No. of credits
	DSC-ID: Microcontroller and Embedded Systems(Paper-IV)	4	2	10	40	50	4
	Practicals						
	DSC-ID: Microcontroller-8051Lab (Paper-IV)	3	2		25	25	2

SEM V	**Theory**						
	DSC-IE:Computer hardware-I (paper-V)	3	2	10	40	50	3
	DSE-IE: E1: Operating system (paper VI:E1) E2:Computer networks (paper VI:E2)	3	2	10	40	50	3
	Practicals						
	DSC-IE: Computer hardware-I Lab (Paper-V)	3	2		25	25	2
	DSE-IE: E1: Operating system Lab (paper VI-E1) E-2: Computer network Lab (Paper-VI-E2)	3	2		25	25	2

Sem.	Courses	Hours per week	Duration of Exam Hrs	Marks			No. of Credits
				Internal	External	Total	
SEM VI	**Theory**						
	DSC-IF: Computer hardware-II (Paper-VII)	3	2	10	40	50	3
	DSE-IF: -E1: Photonic devices and power electronics(Paper-VIII-E1) E2: VHDL(Paper-VIII-E2)	3	2	10	40	50	3
	Practicals						
	DSC-IF: Computer hardware-IILab (Paper-VII)	3	2		25	25	2
	DSE-IF: E1: Photonic devices and power electronicsLab(Paper-VIII: E1) E2: VHDL- Lab (Paper VIII-E2) OR PROJECT	3	2		25	25	2

CC: Core Course DSC: Discipline Specific Course, DSE: Discipline Specific Elective

Course Type	Semester	Number of Paper	Marks for each paper	Total Marks	No. of Credits	Total Credits
Foundation Course	I, II, III, IV	8	50	400	32	32
Add on Courses						
AECC	I, II	2	50	100	4	8
SEC	III, IV	2	50	100	4	
Core Courses						
DSC: Theory	I, II, III, IV	12	50	600	48	132
	V, VI	6	50	300	18	
Practicals	I, II, III, IV	12	25	300	24	
	V, VI	6	25	150	12	
DSE: Theory	V, VI	6	50	300	18	
Practicals	V	3	25	75	6	
Project	VI	3	25	75	6	
Total of add on and core courses					140	172

Nizam College (Autonomous)
Department of Physics
COMPUTER HARDWARE
DSC-IA (Paper-I)

Digital circuits and combination logic

I Year B.Sc **Semester: I**

48 hours (4 hr/week)

Unit I: Boolean Algebra and Logic Gates **12 hours**

Binary Number Systems, Binary to Decimal, Decimal to Binary conversion, Hexadecimal system. Gates:Inverter/Not,OR,ANDGates:truthtables,NOR,NAND gates, Demorgans theorems, Boolean algebra, Equations of logic gates. Introduction to ASCII and Gray codes.

Unit II: Circuit Analysis and Design **12 hours**

Boolean lows and theorems, sum of the products method, truth table to karnough map, pairs, quads and octets etc. Karnaugh simplification, product of sums method. Data processing Circuits: Multiplexers, Encoders and Decoders, Exclusive or gate, Parity generators and checkers.

Unit II : Arithmetic Circuits **12 hours**

Binary Addition, subtraction, 2's complement, 2's complement Arithmetic, Arithmetic Building Blocks : Half address, full adder, the Adder Subtractor, Binary Multiplication and Division, Read only Memory(ROM), Programming the ROM, Application, Random Access Memory(RAM).

Unit IV: Sequential Digital Systems **12 hours**

A 1-bit storage cell (Flip-Flop). The clocked R-S Flip Flop, the J-K Flip Flop, the T-Flip Flop, Shift Registers, Ripple(Asynchronous)computer, Divided-by-N Computer, Synchronous counters, Applications of Counters, the J-k Flip Flop, present and Clear, race around condition, Master slave J-K Flip-Flop, The D- type Flip Flop, Random-Access Memory (RAM), Memory Decoding, Error-Correcting Codes.

Recommended Books:

1. Digital Principles and Application: Albert Paul Malvino, Donald P.Leach.
2. Digital Design: Morris Mano.

Digital Electronics Lab

Semester-I- DSC-IA (Paper-I)

39 hours (3 hr/week)

Experiments List:

1). Logic Gates verification of Truth Tables

2). Verification of Demorgans Laws.

3). Half Adder using Gates.

4). Full Adder using Gates.

5). Multiplexer.

6). De Multiplexer.

7). SOP,POS,

8).Gray ti Binary,Binary to Gray Conversion.

Other Experiments as suggested by the teacher.

Nizam College (Autonomous)
Department of Physics
COMPUTER HARDWARE

DSC-IB (Paper-II)
Digital Design

I Year B.Sc **Semester:II**

48 hours (4 hr/week)

UnitI: Digital Integrated Circuits **12 hours**

Introduction, Special Characteristics, Bipolar –Transistor Characteristics, RTL and DTL Circuits, Transistor-Transistor Logic Circuits (TTL),Emitter-Coupled Logic Circuits(ECL), Metal-Oxide Semiconductor(MOS), Complementary MOS(CMOS), CMOS Transmission Gate Circuits.

UnitII: Synchronous Sequential Logic **14 hours**

Introduction, Flip-Flop Excitation Tables, Characteristic Equations for Flip Flops, Sequential Circuits or State Machines, Mealy and More Models (Block Diagrams only), Analysis of Clocked Sequential Circuits, State Tables and State Diagrams. Design Procedure, Designing SM with Edge Triggered Flip Flops (D,J-K Type), State Reduction and Assignment, Design of Counters , Binary Sequence and Non-binary Sequence.

UnitIII: MIS and PLD Components, Algorithm State Machines (ASM) **12 hours**

Introduction, Binary Adder and Subtractor, Decimal Adder, Magnitude Comparator, Decoders and Encoders, Multiplexers, Read Only Memory(ROM), Programmable Logic Array(PLA) Programmable Array Logic(PAL). Introductionto ASM Chart, Timing Considerations, Control implementations, Design with Multiplexers, PLA control.

UnitIV: Operational Amplifiers and Data Convertors. **10 hours**

Introduction to Operational amplifiers,Inverting,Non-Inverting amplifiers, R-2R,Ladder,Integrated Analog to digital, Digital to analog converters.

Recommended Books:

1. Digital Design: Morris Mano, PHI
2. Digital Principles and Applications: Malvino& Leach, TMH

Digital design Lab –II

Semester-II- DSC-IB (Paper-II)

Experiments List: **39 hours (3 hr/week)**

1). R-S, Clocked R-S Flip Flops.

2). Type-D, Type-T Flip Flops.

3). J-K, Master-Slave J-K Flip Flops.

4). BCD-Seven Segment Driver.

5). Binary Counter.

6). Decade Counter

7). Shift Register.

8). Diode, Transistor, MOSFET Characteristics, Operation as a switch,

9). RTL,TTL, CMOS gates using Discrete components.

**Encouraged to do Small applications using Digital logic as suggested by the teacher.*

Nizam College (Autonomous)
Department of Physics
COMPUTER HARDWARE
DSC-IC (Paper-III)

Microprocessor Architecture, Programming and Applications with the 8085

II Year B.Sc Semester: III

48 hours (4 hr/week)

Unit I:8085 Microprocessor Architecture and Memory, I/O Interfacing 10 hours

The 8085 MPU, Architecture, Pin details, General purpose registers, ALU, Status and control signals, Interrupts. Example of an 8085-Based Microcomputer, Generation of control signals, Memory Interfacing, 8155- Memory Section, Basic Interfacing Concepts, Interfacing Output Displays, Interfacing Input Devices, Memory-Mapped I/O.

Unit II: Instruction Set of the 8085 12 hours

The 8085 Instruction set, Classification, Instructions Format, Data Transfer Operations, Arithmetic , Logical , Branching Operations, Programming Techniques with Looping, Counting and Indexing, 16-Bit Data Transfer and Arithmetic Instructions, Arithmetic Operations Related to Memory. Conditional Call and Return Instructions, Subroutine Concepts, Stack, Time delay, BCD-to-Seven Segment-Led, BCD Arithmetic, Code conversions, Examples.

Unit III: Interrupts 14 hours

The 8085 Interrupts, Additional 8085 Interrupts, Restart as Software Instructions, Additional Concepts and Processes, Interfacing the 8259 Programmable Interrupt Controller, Software Development System and Assemblers: Microprocessor-Based Software Development Systems, Operating Systems, Assemblers and Cross-Assemblers, Writing Program using an Assembler.

Unit IV: Interfacing peripherals 12 hours

General-Purpose Programmable Peripherals, The 8255 A Programmable Peripheral Interface ,Interfacing Keyboard and seven-Segment, Display, Bi-directional Data Transfer between Two Micro Computers. The 8254(8253)Programmable Interval Timer, programming the 8253 as a Counter. The 8257 DMA Controller DMA Interfacing, Initialization, DMA Execution. Digital-to-Analog(D/A) Converters, Analog-to-Digital(A/D) Converters and interfacing.

Recommended Books:

1). Microprocessor Architecture, Programming Applications with the 8085/8080A:

Gaonkar (Wiley Eastern Ltd.)

2).Introduction to Micro Processors:-AdityP.Mathur (Tata McGraw Hills)

3). 8080/8085 Assembly Language Programming:-Lance (Lavental) (Tata McGraw Hill)

4). Microprocessor and Microcontrollers:-Prof.C.R.Sarma (Premier Publishing House)

Microprocessr-8085 Lab

Semester-III-DSC-IC (Paper-III)

Experiments List: **39 hours (3 hr/week)**

1). Addition of 8bit,16bit numbers

2). Subtaction of numbers

3). Multiplication of 8bit numbers

4). Division of a 8bit number with another 8bit number

5). Finding the factorial of a given number.

6). Finding the sum of series of N numbers.

7). Finding the Largest number.

8). Hexadecimal to Decimal conversion.

9). Interfacing Stepper Motor.

Other Experiments as suggested by the teacher.

Nizam College (Autonomous)
Department of Physics
COMPUTER HARDWARE
DSC-ID (Paper-IV)

Microcontroller and Embedded Systems

II YearB.Sc Semester: IV

48 hours (4 hr/week)

Unit I: The 8051 Microcontrollers 12 hours

Microcontrollers and Embedded Processors, Overview of the 8051 Family, Architecture and Pin description. Assembly Language Programming, Assembling and Running an 8051 Program. The Program Counter and ROM Space in the 8051, Data types and Directives, 8051 Flag Bits and the PSW Register, RAM, Register Banks, S.F.R ,DPTR, I/O Ports and Stack Pointer.

Unit II: I/O Port Programming of 8051 12 hours

I/O Programming, Bit Manipulation. Addressing Modes: Immediate, register, Direct, Indirect. Accessing Memory Using Various Addressing Modes. Arithmetic Instructions and Programs, Logic Instructions, and Programs, Single-Bit Instructions, Branching Instructions, Call and Return and Programming. Generating SoftwareDelay,Calculating Delay. Interfacing LEDs to the Ports. Basics of KEIL Software and Programming.

Unit III: Timer/Counter, Simple Interfaces 12 hours

Timers in 8051, TMOD, TCON registers, Using Timers in Poling. Generating Hardware Time Delays, Generation of Wave forms using D/A converters. Timer as a Counter, Interfacing LED, LED - Seven - Segment, LCD Display. Programmable Peripheral Interface 8255. Interfacing Stepper -Motor, Key- Pad and Sensors Interfacing

Unit IV: Interrupts and Serial Communication. 12 hours

8051 Interrupts, Programming Timer Interrupts, External Hardware Interrupts, Serial Communication Interrupts, Interrupts- Priority in the 8051. Basics of Serial Communication: 8051 Connection to RS232, 8051 Serial Communication Programming.

Recommended Books:

1. The 8051 Microcontroller: Architecture, Programming, and Applications
   Author: Kenneth J. Ayala
2. 8051 and Embedded Systems. Author: Muhammad Ali Mazidi
3. Microprocessors and Microcontrollers. Author: Prof.C.R.Sarma (Premier House)

Microcontroller 8085 Lab

Semester-IV- DSC- ID (Paper-IV)

Experiments List: **39 hours (3hr/week)**

1). Addition of 8bit,16bit numbers.
2).Subtraction of 8bit,16bit numbers.
2). Multiplication of 8bit numbers
3). Division of a 8bit number with another 8bit number
4). Finding the factorial of a given number.
5). Finding the sum of series of N numbers.
6). Finding the Largest number.
7). Hexadecimal to Decimal conversion.
8). 2's compliment of 8bit,16bit numbers
Interfacing Experiments
9). Stepper Motor.
10).LED Seven Segment Display
11). LCD
12). Digital to Analog Conversion.

**Encouraged to do Small applications using Microcontrollers as suggested by the teacher.*

Nizam College (Autonomous)
Department of Physics
COMPUTER HARDWARE

DSC-IE (Paper –V)

Computer Hardware-I

III YearB.Sc **Semester: V**

40 hours (3 hr/week)

Unit-I.Processors, Mother Boards and buses: **10 hours**

Processors:Evolution of computers, classification of computers, modern computers and history of PC, system types and system components. PC Processors and architecture Evolution, processor specifications, features, manufacturing, processor sockets and slot types. Code names, general features of 086,286,386, 486, 586,686, Intel Pentium 4 processor. Intel core processors, AMD K6, AMD K7, AMD K8, AMD K10. Processor cooling and Heat-sink rating calculations, Processor troubleshooting techniques.

Motherboards and Buses:Mother board form Factors, obsolete form factor, ATX and other modern form factors. Processor sockets/slots. Chipsets, evolution, Intel chipsets and models.Traditional north/south bridge architecture, hub architecture. Block diagram representation of 486,P5,P6 chipsets, Intel 945 Express family, Intel 5x,6x,Series chipsets, Intel, AMD Integrated Graphics. Motherboard Connectors and system Bus types; the Processor Bus, Memory bus, I/O Buses, System Resources, Motherboard selection criteria.

Unit II:BIOS, memory and ATA/IDE interfaces: **10 hours**

BIOS:Basics, Motherboard ROM BIOS, the BIOS upgrading, plug and play BIOS and BIOS Error Messages.

Memory:ROM, DRAM, SRAM, types of RAM and memory modules. RAM upgrades, troubleshooting memory.

ATA/IDE interface:Overview of the IDE interface, ATA standards; parallel ATA and serial ATA, ATA features and ATA drive capacity limitations.

Unit III: Types of Storages: **10 hours**

Magnetic storage: How magnetic fields are used to store data, read/write head design. Data encoding schemes; FM encoding, MFM encoding, RLL encoding, areal density, capacity measurements and perpendicular magnetic recording.

Hard disk storage: Hard drive advancements and form factors. Hard disk drive operation and basic hard disk drive components. Hard disk features; capacity and performance.

Removable storage: Role of removable media drives; flash memory media, magnetic disk media, magnetic tape media, types of flash memory drives and floppy disk drives.

Optical storage: CD-based optical technology, DVD construction technology, DVD tracks and sectors, handling errors. Optical disk format; CD and DVD formats and copy protection, optical dive performance and trouble shooting.

Unit IV: Video and Audio hardware: 10 hours

Video hard ware: Display adapters and monitors, integrated video/motherboard chipsets, video RAM and DAC. Video display interface, system interface, display interface, digital display interface, TV display interface. Monitors display specifications, LCD, CRT, Plasma display technologies. Homogeneous and heterogeneous adapters, video capture devices, troubleshooting and maintenance. Maintaining monitors, testing, adjusting monitors, bad pixels. Troubleshooting and repairing monitors.

Audio hardware: Early PC audio adapters and its limitations, sound drives and sound cards. Audio adapter concepts, evaluating the quality, sampling and installation sound cards. Troubleshooting sound card problems, hardware conflicts and onboard audio problems. Speakers and its selection criteria and microphones.

Recommended Books:

1. Upgrading and Repairing PCs. 20th Edition (with DVD) - Scott Mueller(Pearson Education)
2. PC Hardware-A Beginners Guide – Ron Gilster, (McGraw-Hill)
3. Principles of Computer Hardware,4th edition –Alan Clements(Oxford University Press)

Computer hardware –I Lab

Semester-V- DSC-IE (Paper-V)

Experiments List: **39 hours (3 hr/week)**

1. Identification of Mother Board Components.(Processors, sockets, Chipsets, Connectors)
2. Keyboard, Mouse trouble shooting.
3. Making Serial, Parallel, Programming Cables, Crimping RJ45, Parallel Crimps.
4. Power supply Troubleshooting.
5. Assembling and installing Computer.
6. Front panel interfacing.
7. BIOS Settings, configuration.
8. Updating BIOS.

Other Experiments as suggested by the teacher.

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Department of Physics
COMPUTER HARDWARE

DSE-IE: E1 (Paper –VI-E1)

Operating system

III YearB.Sc **Semester: V**

40 hours (3 hr/week)

Unit -I: **Operating System Overview and Process Description** **10 hours**

SystemObjectives and functions: Evolution,major Achievements, types of O.S, O.S.

Structure – Layered Approach, Kernel Approach, Virtual Machine, Client – Server Model.

Process concept: Process states, Process Description, Process Control, Processes and Threads. Inter Process communication and synchronization:Basic Concept of Concurrency, Concept of Inter Process Communication: Mutual Exclusion, Semaphores, message passing.

Deadlocks and Starvation*:* Principles of Deadlock, Detection, Prevention and Avoidance.

Unit- II: Memory Management and uniprocessor Scheduling **10 hours**

Loading programs into Main Memory, Paging, Segmentation. Virtual Memory and its advantages. Demand Paging and virtual Memory Management Policies.

Types of Scheduling, Scheduling Algorithms.

Real Time Scheduling: Characteristics of real Time Operating Systems, Real Time Scheduling**.** Multiprocessor scheduling with examples.

Unit III: I/O Disc-file management and Distributed Systems **10 hours**

I/O Devices, Organization of I/O functions, Operating system design issues, I/O Buffering, Disc Organization, Disc Allocation Methods, Disc Scheduling, RAID and Disc Cache, File Concept, File Organization and access, File Directories, File sharing, Secondary Storage management.

Client server computing, Distributed message passing, Remote procedure calls, Clusters, Distributed process management, process migration, Distributed global states, Distributed mutual exclusion, distributed deadlock.

Unit IV: Operating System Design and Computer Security **10 hours**

Interface Design, Principles of OS Design, System call Interface, Implementation and Performances.

Security threads, Protection of Memory, Protection Oriented Access control, Data Oriented Access Control, Intruders ,Intrusion techniques, Password Protection, Password Selection

Strategies, Intrusion Detection, Malicious Software, Malicious Programs, The Nature of Viruses, Antivirus Approaches, E-mail Viruses, Trusted Systems.

Recommended Books:

1. Operating Systems – William Stallings (4th Edition), PHI Publications
2. Modern Operating Systems – Andrew Tenanbaum
3. Operating Systems– Galvin

Computer OS Lab

Semester-V DSE: IE (E1) Paper-VI-E1

Experiments List: **39 hours (3 hr/week)**

1. BIOS, CMOS SETUP.
2. HDD Partitioning and Formatting.
3. Installing XP, exploring XP features.
4. Making Bootable Flash Drive (XP,WIN7,8,10).
5. Creating Multi operating system Disk.
6. Backup and Restoration.
7. Windows Server installation, User Groups, Privileges
8. Configuring TCP/IP using DHCP and setting up a LAN
9. Linux Installation and configuration.

Other Experiments as suggested by the teacher.

Nizam College (Autonomous)
Department of Physics
COMPUTER HARDWARE

DSE-IE: E2 (Paper –VI-E2)

Computer networks

III YearB.ScSemester: V

40 hours (3 hr/week)

Unit-I Computer network: 10 hours

Introduction: Data Communication, Networks, Protocols and Standards, Topology, Categories of Networks, OSI & TCP/IP Protocol suites.

Physical Layer: Transmission modes, DTE-DCE Interface, Modems, Guided media, Unguided media, Performance, Multiplexing, Switching, DSL, FTTC.

Unit-IIData Link Layer: 10 hours

Data Link Layer: Data Link Control - Line discipline, Flow control, Error control; Data Link protocols– Asynchronous Protocols, Synchronous protocols, Character oriented protocols, Bit oriented protocols, Link Access Procedures.

LANS and MANS: Project 802, Ethernet, Token Bus, Token Ring, FDDI, Fast Ethernet, Giga bit

Ethernet, DQDB, SMDS, PPP.

Unit –IIINetwork Layer: 10 hours

Network Layer: Repeaters, Bridges, Hubs, Switches, Routers, Gateways, Routing algorithms -

Shortest path routing, Distance vector routing, Link state routing; X.25 layers and protocols,

Congestion control - Leaky bucket algorithm, TCP/IP Protocol Suite- IP protocol, IP addresses,

Sub-netting, IPv4, IPv6 ARP, RARP; ICMP, ISDN Services and channels, Broadband ISDN, ATM- Design goals, architecture and layers.

Unit-IV Transport and applications: 10 hours

Transport Layer: Responsibilities of Transport layer, Transport connection, OSI Transport protocol, TCP, UDP

Application Layer: BOOTP and DHCP, DNS, TELNET, FTP, SMTP, HTTP, WWW, VoIP, Four aspects of Network security, Privacy, Digital Signatures.

Recommended Books:

1. Data Communications and Networking,BehrouzaForouzan 2nd Edition, Tata McGraw-Hill, New Delhi, 2003
2. Computer Networks,Andrews Tanenbaum , 4th Edition, Prentice-Hall of India, New Delhi, 2000.
3. Data and Computer Communication,William Stallings, 6th Edition, Prentice Hall of India, New Delhi, 1999.
4. Computer Networks and Internet, Douglase Comer Pearson Education Asia, 2000.

Computer networks Lab

Semester-V-DSE-IE2 (Paper-VI-E2)

Experiments List: **39 hours (3 hr/week)**

1). Understanding Networks.

2). Preparing cables, crimping.

3). Configuring IP.

4). Creating LAN.

5). Sub netting

6). Configuring Network Devices.

7). Interconnecting LANs

Other experiments as suggested by the teacher

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COMPUTER HARDWARE

DSC-IF (Paper –VII)

Computer hardware-II

III YearB.Sc **Semester: VI**

40 hours (3 hr/week)

Unit I: Introduction to I/O interfaces: **10 hours**

I/O interfaces: I/O ports, differences between serial and parallel ports, universal serial bus (USB), IEEE 1394, Hot-plugging and low speed external connections.

Input devices: Keyboards (101,104), Keyboard/mouse interface connectors, USB keyboards. Keyboard troubleshooting and repair. Pointing devices; ball type mice, optical mice and mouse troubleshooting. Wireless input devices and troubleshooting.

Unit II Internet and local area networking: **10 hours**

Internet connectivity: Broadband internet access types, dialup modems, modern standard protocols, bits and baud rates, modulation standards, error-correction protocol, data compression and internet connection security.

Local area networking: Types of network, Clint/server networks and peer-to-peer networks. Network architecture; wired Ethernet and wireless Ethernet and Bluetooth. Network protocol; IP and TCP/IP, IPX, NetBEUI. Setting up security and sharing internet connections.

Unit III:Power supply and upgrading systems: **10 hours**

Power Functions: Positive DC voltage, negative DC voltage, power supply form factor, obsolete form factor, modern form factor. Power switches; ATX, PC/XT/AT and LPX. Motherboard power connectors (ATX and ATX 12V), compatibility and ATX design. Additional power connectors and specifications. Power use calculations, power cycling, power management and power supply troubleshooting and power-protections.

Upgrading systems: System components, processor, motherboard, memory, hard disk drives, removable storage, input devices and accessories. Motherboard installation, installation CPU and heat sink, installing memory modules, mounting new motherboard, connecting power supplies and other cables. Installing the drives, video card, other additional expansion cards, external cables and System startup.

Unit IV: PC testing and maintenance: 10 hours

PC diagnostics; the power-on self-test, peripheral diagnostics, operating system diagnostics, commercial and supported diagnostics. The boot process; hardware booting, DOS booting, Windows 9X booting and XP. PC maintenance tools, hand tools, safety, test equipment and special tools, active and passive maintenance, troubleshooting tips and techniques.

Recommended Books:

1. Upgrading and Repairing PCs. 20th Edition (with DVD) - Scott Mueller(Pearson Education)
2. PC Hardware-A Beginners Guide – Ron Gilster, (McGraw-Hill)
3. Principles of Computer Hardware,4th edition –Alan Clements(Oxford University Press)

Computer hardware-II lab

Semester-VI DSC-IF (Paper-VII)

Experiments List: **39 hours (3 hr/week)**

1. Booting with Flash Drive.
2. Installing Drivers. Finding required Drivers.
3. Hard disk disassembly identifying internal parts
4. Data Recovery.
5. CD/DVD disassembly identifying internal components and troubleshooting.
6. Local area Clint and sever networking
7. Setting up security
8. Operating system diagnostics
9. Trouble shooting tips and techniques

Other Experiments as suggested by the teacher.

Nizam College (Autonomous)
Department of Physics
COMPUTER HARDWARE
DSE-IF-E1 (Paper-VIII-E1)

Photonic devises and power electronics

III YearB.Sc **Semester: VI**

40 hours (3 hr/week)

Unit -I: Photonic devices: **10 hours**

Classification of photonic devices, Interaction of radiation and matter, radiativetransition and optical absorption. Light Emitting Diodes- Construction, materials and operation.

Semiconductor Laser- Condition for amplification, laser cavity, heterostructureand quantum well devices. Charge carrier and photon confinement, line shape function. Threshold current. Laser-diode.

Photo detectors: Photoconductor. Photodiodes (p-i-n, avalanche) and Photo transistors, quantum efficiency and responsivity.Photomultiplier tube. Solar Cell: Construction, working and characteristics

Unit-II: LCD display and fiber optics **10 hours**

LCD Displays: Types of liquid crystals, Principle of Liquid Crystal Displays, applications, advantages over LED displays.

Introduction to Fiber Optics: Evolution of fiber optic system- Element of an Optical Fiber Transmission link- Ray Optics-Optical Fiber Modes and Configurations –Mode theory of Circular Wave guides- Overview of Modes-Key Modal concepts- Linearly Polarized Modes - Single Mode Fibers-Graded Index fiber structure.

Unit –III: Metal oxide semiconductor field effect transistor (MOSFET): **10 hours**

Power Devices: Need for semiconductor power devices, Power MOSFET (Qualitative). Introduction to family of thyristors.Insulated Gate Bipolar Transistors (IGBT): Basic structure, I-V Characteristics, switching characteristics, device limitations and safe operating area (SOA).

Unit IV: Silicon Controlled Rectifier (SCR) 10 hours

SCR- structure, I-Vcharacteristics, Turn-On and Turn-Off characteristics, ratings, Gate-triggering circuits.Diac and Triac- Basic structure, working and V-I characteristics. Application of Diac as a triggering device for Triac.

Applications of SCR: Phase controlled rectification, AC voltage control using SCR and Triac as a switch. Power Invertors- Need for commutating circuits and their various types, dc link invertors, Parallel capacitor commutated invertors, Series Invertor, limitations and its improved versions, bridge invertors.

Recommended books:

1. Optoelectronics: An Introduction, J. Wilson & J.F.B. Hawkes, Prentice Hall India (1996).
2. Optoelectronics & Photonics, S.O. Kasap, Pearson Education (2009)
3. Introduction to fiber optics,AK Ghatak& K Thyagarajan, Cambridge Univ. Press (1998)
4. Power Electronics, P.C. Sen, Tata McGraw Hill
5. Power Electronics, M.D. Singh & K.B. Khanchandani, Tata McGraw Hill
6. Power Electronics Circuits, Devices & Applications, 3rd Edn., M.H. Rashid,Pearson Education
7. Optoelectronic Devices and Systems, Gupta, 2nd Ed., PHI learning. •
8. Electronic Devices and Circuits, David A. Bell, 2015, Oxford University Press.

Photonic devices and power electronics Lab

Semester-V DSE: IF (E1) Paper-VIII-E1

Experiments List **39 hours (3 hr/week)**

1. To determine wavelength of sodium light using Michelson's Interferometer.

2. Diffraction experiments using a laser.

3. Study of Electro-optic Effect.

4. To determine characteristics of (a) LEDs, (b) Photo voltaic cell and (c) Photo diode.

5. To study the Characteristics of LDR and Photodiode with

(i) Variable Illumination intensity (ii) Linear Displacement of source.

6. To measure the numerical aperture of an optical fiber.

7. Output and transfer characteristics of a power MOSFET.

8. Study of I-V characteristics of SCR

9. SCR as a half wave and full wave rectifiers with R and RL loads

10. Study of I-V characteristics of DIAC

11. Study of I-V characteristics of TRIAC

Department of Physics
COMPUTER HARDWARE
DSE: IF-E2 (Paper-VIII-E2)

VHDL

III YearB.Sc **Semester: VI**

40 hours (3 hr/week)

Unit – I: Basics of VHDL and behavioural modeling **10 hours**

Introduction to HDL languages: Difference between HDL and other software languages, different HDL in vogue. Over view of digital system design using HDL.

Basic VHDL language elements: Identifiers, data objects, scalar and composite types, operators. Behavioural modeling with examples: Entity declaration, Architecture body, Process and sequential statements. Inertial and transport delay models, creating signal waveforms, signal drivers,

Unit – II: Data flow and structural modeling **10 hours**

Data flow modeling with examples: Concurrent signal assignment statement, concurrent vs. sequential signal assignment, delta delays, multiple drivers, conditional signal assignment statement, selected signal assignment, concurrent assertion statement.

Structural modeling with examples: Component declaration, component instantiation and all examples, direct instantiation of component.

Unit – III: Subprograms and packages: **10 hours**

Subprograms and overloading: Functions and procedures with simple examples- subprogram overloading – operator overloading.

Packages and libraries: Package declaration, package body, design file, design libraries, order of analysis, implicit visibility, explicit visibility, library clause and user clause.

Advanced features: Entity statements -generate statements, attributes, aggregate targets, ports and their behavior.

Unit – IV: Simulation and hardware modeling: **10 hours**

Model simulation: Simulation-writing a Test Bench for a half-adder and full-adder.

Hardware modeling examples: Modeling entity interfaces, modeling simple elements, different styles of modeling, modeling regular structures, modeling delays, modeling conditional operations, modeling a clock divider and a pulse counter.

Recommended books:

1. A VHDL Primer, J. Basker, 3rd Edition, PHI, New Delhi.
2. Circuit design with VHDL, VolneiPedroni, PHI, New Delhi, 2007.
3. DDigital systems design using VHDL, Charles H Roth Jr, PSW Pub. 1998.
4. Introductory VHDL: From simulation to synthesis: SudhakarYalamanchili, Pearson Education Asia, 2001.
5. VHDL Programming by example, Douglas I Perry, TMH, 2002.
6. Fundamentals of digital logic with VHDL design, Stephen Brown & Z Vranesic, TMH, 2002.
7. VHDL- Analysis & modeling of digital systems, ZainaladedinNavabi, 2ndEdn TMH-1998.
8. The designer's guide to VHDL, Peter J Ashenden, 2nd Ed., Harcourt India Pvt. Ltd., 2001.

VHDL Lab

Semester-VI DSE: IF-E2 (Paper-VII-E2)

Experiments List: **39 hours (3 hr/week)**

VHDL-Program entry, simulation & implementation (CPLD/FPGA) using appropriate HDL software for the following circuits:

1. All types of Logic gates (data flow)
2. Half-adder (data flow, structural and schematic)
3. Full adder (data flow, structural and schematic)
4. Half subtractor (data flow, structural and schematic)
5. Full subtractor (data flow, structural and schematic)
6. Two control input Mux-using case
7. Two control input Mux-using conditional signal assignment
8. Two control input Mux-using selected signal assignment
9. Two control input Demux-using case
10. BCD to seven segment decoder (schematic)
11. Modeling a RS-FF with assertion, report & different levels (behavioural)
12. Modeling a BCD counter (top level behavioural)
13. Writing a test bench for a half adder/full adder.

Nizam College (Autonomous)
Model Question Paper for Internal Exams
(B.SC)

Marks:10 **Time : 30 Min**

Fill in the blanks (5 X ½ = 2 ½)

1.
2.
3.
4.
5.

Multiple Choice Questions (5 X ½ = 2 ½)

1.
2.
3.
4.
5.

Short Answer Questions (5 x 1= 5)

1.
2.
3.
4.
5.

P R I N C I P A L

Nizam College (Autonomous)
Model Question Paper for Semester Exams
Faculty of Science (B.Sc)
Semester I-IV

Marks: 40 Time: 2 Hours

Section –A-----(4 x 3 =12)
(Short Answer Questions)

1. UNIT-I
2. UNIT-II
3. UNIT-III
4. UNIT-IV

Section –B------(4 x 7 =28)
(Essay Questions)

5 (a) **UNIT-I**
OR
5(b)
6 (a) **UNIT-II**
OR
6(b)

7 (a) **UNIT-III**
OR
7(b)

8(a) **UNIT-IV**
OR
8(b)

P R I N C I P A L

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Nizam College (Autonomous)
Model Question Paper for Semester Exams
Faculty of Science (B.Sc)
Semester V & VI

Marks: 40 Time: 2 Hours

Section –A-----(4 x 3 =12)
(Short Answer Questions)

1. UNIT-I
2. UNIT-II
3. UNIT-III
4. UNIT-IV or Question form Unit –I to Unit III

Section –B------(4 x 7 =28)
(Essay Questions)

5 (a) **UNIT-I**
OR
5(b)
6 (a) **UNIT-II**
OR
6(b)

7 (a) **UNIT-III**
OR
7(b)

8(a) **UNIT-IV or Question form Unit –I to Unit III**
OR
8(b)

P R I N C I P A L

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