

Head Technical Assistants
Electronics and Computer Engineering
(Syllabus)

FM: 100, PM: 40

1. Digital logic and design fundamentals [6hrs]
 - 1.1. Digital and Analog Signals
 - 1.2. Logic operations of Gate (basic, derived and universal gates)
 - 1.3. Number conversion system
 - 1.4. Complement of number system
 - 1.5. Logic function and Boolean Algebra
 - 1.6. Combinational and sequential logic
2. Fundamentals of electronics device and circuits [6hrs]
 - 2.1. Diode characteristics
 - 2.2. Junction Diode, Zener Diodes
 - 2.3. Physical operations of Diode
 - 2.4. Properties and application of Bipolar Junction Transistors
 - 2.5. Properties and application of MOSFET
 - 2.6. Types of Power Amplifiers
 - 2.7. Oscillator characteristics
 - 2.8. Relaxation Oscillator and Sinusoidal Oscillator
 - 2.9. DC circuits, Single Phase AC circuits
3. Microprocessor and Operation System [8hrs]
 - 3.1. Organization of Microprocessor Based System
 - 3.2. Microinstructions and Hardwired/Microprogrammed Control Unit
 - 3.3. 8085/8086 Microprocessor addressing mode and instructions set
 - 3.4. Interfaces: Parallel/Serial interfaces,
 - 3.4.1. Programmable Peripheral Interface
 - 3.4.2. Serial Interface Standards: RS232, RS423, RS422, USB
 - 3.4.3. USART
 - 3.5. Functions, types of Operating System
 - 3.6. Processes, Threads and Scheduling
 - 3.7. Memory Management
 - 3.8. DMA and DMA controllers
 - 3.9. Deadlock
4. Hardware, Networking and Communications [12hrs]
 - 4.1. Assembling of PC
 - 4.2. Firmware upgrade, Dual BIOS & BIOS settings
 - 4.3. Diagnose & Resolve issues related to a PC/Laptop
 - 4.4. OS Installation and Troubleshooting
 - 4.5. Installation and testing of a printer, Printer, Scanner, Webcam installation
 - 4.6. Making various types of cables for networking

- 4.7. Concept of signal, bandwidth, its properties, filtering of random signals through LTI systems
 - 4.8. Digital modulation schemes (ASK, PSK, FSK, QAM)
 - 4.9. Firewalls and Connectivity of LAN & WAN, wireless networking
 - 4.10. Wired and wireless network medium: Magnetic Media, Twisted Pair, Coaxial Cable, Fiber Optics, Wireless Transmission - Radio Transmission, Microwave Transmission, Satellites.
 - 4.11. Structure of Telephone System, Trunks and Multiplexing, Switching
 - 4.12. OSI and TCP/IP model.
 - 4.13. IPv4 and IPv6 addressing, Routing
- 5. Software, Programming and Data Structure [6hrs]
 - 5.1. Types of Software
 - 5.2. Characteristics of procedural and object oriented programming
 - 5.3. Functions, methods, data types, recursion, array, stacks, queues and binary search
 - 5.4. HTML, CSS, SQL, Java Script
 - 5.5. Office Applications: Word, Excel, PowerPoint, Database
 - 5.6. Introduction to visual Programming -Concept of event driven programming
 - 5.7. Engineering Ethics & professional practice
 - 6. Computer Graphics [3 hrs]
 - 6.1. Display Devices, hard copy Devices, Line Drawing Algorithms
 - 6.2. Windowing and clipping algorithms
 - 6.3. 3D representation: polygon and curved surface, 3D transformations
 - 7. Information and Communication Technology Trends [4hrs]
 - 7.1. ICT – its concept and scope
 - 7.2. Latest trends in ICT development
 - 7.3. 4G/LTE/5G networks and applications
 - 7.4. AI, Blockchain, IoT and Machine Learning fundamentals

Written Exam Questions [Full Marks: 100, 3Hrs]

Chapters	1	2	3	4	5	6	7	Total Marks
MCQ	3	3	3	5	3	2	1	20
Short [5 marks each]	1	1	1	2	1	1	1	40
Long [10 marks each]		1	1	1	1	-	-	40

- Teak practical exam if necessary [full Marks: 20]
- Interview [Full Marks: 20]