



# **Savitribai Phule Pune University**

*(Formerly University of Pune)*

**Three Year B.Sc. Degree Program  
(Faculty of Science & Technology)**

**Vocational Course  
Computer Hardware and Network Administration  
(CHNA)**

**Choice Based Credit System (CBCS) Syllabus**

**To be implemented from Academic Year 2019-2020**

**Vocational course: Computer Hardware and Network Administration (CHNA)****Preamble:**

The systematic and planned curricula from first year to the third year shall motivate and encourage the students for gaining expertise in computer maintenance and Network administration and for becoming an entrepreneur.

**Titles of Papers and Scheme of Study Evaluation****F. Y. B. Sc. (Computer Hardware and Network Administration (CHNA))**

| Sem | Paper Code | Paper | Paper title                | Credits | Lectures/Week |     |     | Evaluation |    |       |
|-----|------------|-------|----------------------------|---------|---------------|-----|-----|------------|----|-------|
|     |            |       |                            |         | Th            | Tut | Pr. | CA         | UE | Total |
| I   | CHNA- 111  | I     | Essentials of Computers-I  | 2       | 3             |     |     | 15         | 35 | 50    |
|     | CHNA- 112  | II    | Computer Organization-I    | 2       | 3             |     |     | 15         | 35 | 50    |
|     | CHNA- 113  | III   | CHNA Lab-IA                | 1.5     |               |     | 4   | 15         | 35 | 50    |
| II  | CHNA- 121  | I     | Essentials of Computers-II | 2       | 3             |     |     | 15         | 35 | 50    |
|     | CHNA- 122  | II    | Computer Organization-II   | 2       | 3             |     |     | 15         | 35 | 50    |
|     | CHNA- 123  | II    | CHNA Lab-IB                | 1.5     |               |     | 4   | 15         | 35 | 50    |

**S. Y. B. Sc. (Computer Hardware and Network Administration)**

| Sem | Paper Code | Paper | Paper title                          | Credits | Lectures/Week |     |     | Evaluation |    |       |
|-----|------------|-------|--------------------------------------|---------|---------------|-----|-----|------------|----|-------|
|     |            |       |                                      |         | Th            | Tut | Pr. | CA         | UE | Total |
| I   | CHNA- 231  | I     | Computer System Maintenance-I        | 2       | 3             |     |     | 15         | 35 | 50    |
|     | CHNA- 232  | II    | 8086 Microprocessor & Interfacing-I  | 2       | 3             |     |     | 15         | 35 | 50    |
|     | CHNA- 233  | III   | CHNA Lab-IA                          | 2       |               |     | 4   | 15         | 35 | 50    |
| II  | CHNA-331   | I     | Computer System Maintenance-II       | 2       | 3             |     |     | 15         | 35 | 50    |
|     | CHNA- 332  | II    | 8086 Microprocessor & Interfacing-II | 2       | 3             |     |     | 15         | 35 | 50    |
|     | CHNA- 333  | II    | CHNA Lab-IB                          | 2       |               |     | 4   | 15         | 35 | 50    |

**Paper I:****CHNA- 111: Essentials of Computers – I**

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**(2 Credits, 36 lectures)****Semester 1****Theory Lectures: 36****Objective**

- 1. To understand importance of CPU.*
- 2. To understand working of different parts in computer system*
- 3. To understand different aspect the hardware of computer system*

**Learning outcomes:****After completion of this course student will be able:**

- 1. To understand evolution of computers.*
- 2. To understand the working of different Hardware parts of Computer*
- 2. To understand the working of input and output devices of Computer*
- 3. To understand working of CPU.*

**Unit 1: Introduction and Overview of System**

Functional Block Diagram, History, Generations of computer, CPU Cabinet: Power supply, SMPS, Motherboard, CPU, Cables and connectors, Main and auxiliary memory, Front and rear panel study.

**Unit 2: Input Output Devices**

Input devices: wired /wireless Keyboard, Mouse, Joystick, Scanner, Digitizers, Light pen, Touch screen, Barcode Scanner Camcorder. Output devices: Monitor (CRT, LCD/ LED Panel,) Printer: Dot Matrix, Inkjet, LASER, Thermal, Plotter, Barcode Printers, Sound devices (Speaker, Bluetooth, dongle)

**Unit 3: Central Processing Unit**

Microprocessor as CPU, General block diagram of CPU, CPU bus system, Packing, Cooling, Sockets and slots, Comparative study of Microprocessor's features with evolutions, Microprocessor Operations:- Instruction Cycle, Data fetch, Address Decoding, Classification of Interrupts, Input Output Techniques, Introduction to multi-core processors, Device Controllers: Concept of DMA, DMA Transfer, DMA controller

**TEXT BOOKS AND REFERENCE BOOKS:**

1. Computer Fundamentals, P. K. Sinha
2. Upgrading and Repairing of PCs, Scott Muller
3. IBM PC and Clones, B. Govindrajalu
4. Microprocessor and Interfacing, D. V. Hall
5. Microprocessor X 86 Programming, Venugopal
6. Computer Motherboard Testing and Fault finding, S. K. Gupta
7. PC Hardware (A+ Certificate guide), Mike Mayer
8. PC Hardware interfaces, Michael Gook

**CHNA- 112: Computer Organization-I (2 Credits, 36 lectures)**

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**Semester 1****Theory Lectures: 36****Objective**

- 1. To understand importance Parts of computer System*
- 2. To understand working of different parts in computer system*
- 3. To understand different aspect the hardware and software of computer system*

**Learning outcomes:****After completion of this course student will be able:**

- 3. To identify different Hardware parts of Computer*
- 4. To understand the working of different Hardware parts of Computer*
- 2. To understand the different operating systems of Computer*
- 3. To understand different ports and its specification of Computer*

**Unit 1: Introduction and Concepts**

Hardware and Software, System Software, Application Software, Firmware, BIOS, POST sequence, Operating Systems, Program, Flow Charts, Loader, assembler, Compiler, Linker, Editor, Simulator, Emulator, Debugger, Device Drivers,

Software Packages and Programming Languages

**Unit 2: Operating System: Types and Functions**

DOS – Introduction, Versions, DOS Commands, Internal, External, Root Directory.

Windows – Introduction, Working with desktop, Control Panel settings.  
Introduction to RTO,

LINUX: Basic Commands,

Introduction to PHABLET and their OS: ANDROID OS, IOS.

### **Unit 3: Microprocessor Study**

History of Intel's Processors,

8086 – Architecture, Instruction set,

Comparison between 80286, 80386 & 80486

Introduction to advanced processors- i series

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4. Microprocessor and Interfacing, D. V. Hall
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8. PC Hardware interfaces, Michael Gook

**SEMESTER I****Paper III****CHNA-113: CHNA LAB I-A (1.5 Credits)**

The practical course consists of **10 experiments** out of which two will be preparatory experiments. These will be evaluated in an oral examination for 15% marks at internal and external semester examination. **Each Practical batch will have maximum 15 students.**

**Preparatory Experiments: (Minimum 2/3)**

1. Site Preparation, Electrical Connections and use of Maintenance kit.
2. Connecting Keyboard, Mouse, Printer, Scanner, Multimedia components and make it working.
3. Study of Various computer operating systems (Min-2).

**Semester I List of Practical's (Minimum 08, 4 from each group):****Group A :( Minimum 4/6)**

- 1) Identifying the peripherals of a computer.
- 2) To identify the front panel indicators and switches and rear side connector in a computer System.
- 3) Assembly and disassembly of computer.
- 4) Identification of cables, connectors and tools.
- 5) Network troubleshooting. & PING test, ipconfig etc
- 6) Printer installation, servicing and troubleshooting.

**Group B: (Minimum 4/6)**

- 1) Practical based on MS Word.
- 2) Practical based on MS Excel.
- 3) Practical based on Power Point.
- 4) DOS based practical Internal External commands (Only Demo).
- 5) Study of BIOS and POST Sequence (Only Demo) and Standard CMOS setup for different configuration.
- 6) Installation of device drivers for External devices.

**Paper II:****CHNA-121: Essentials of Computers - II (2 Credits, 36 lectures)**

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**Semester 2****Theory Lectures: 36****Objectives:**

- 1. To know about different memories used in Computer*
- 2. To understand working of CPU and memories of Computer*
- 3. To understand different parts of the CPU*
- 4. To understand Advanced Technology in Computers*

**Learning outcomes:****After completion of this course student will be able**

- 1. To know about different types of Computer and its specification*
- 2. To understand working of different types of memories used*
- 3. To understand different registers of CPU*
- 4. To understand architecture of CPU*

**Unit 1: Computer Memory and Memory Management Techniques:**

Memory architecture, Memory Parameters (Access time, speed, capacity, cost), Types and characteristics, Classification, Semiconductor, Magnetic, Optical ROM and its types. RAM and its types: SDRAM, EDORAM, DDR Series, Flash RAM. Memory modules, SIMM and DIMMs. Secondary Memory: Hard Disc Drive, Floppy Disc, CDROM, CD R/W, DVD, Pen Drive, flash memories: Mini/micri SD Card. Introduction to USB storage device.

**Unit-2: CPU Architecture**

Basic Computer Structure and Communication inside Computer, Registers based CPU organization, Registers: General purpose, special purpose, MAR, MBR and Memory mapping, ALU, Control Unit (Concept of Micro programmed and Hardwired Control)

**Unit 3: Advanced Technology in Computers**

Server, client, Mainframe, Desktop, Notebook, Tablet, Super Computer etc.

**TEXT BOOKS AND REFERENCE BOOKS:**

1. *Computer Fundamentals, P. K. Sinha*
2. *Upgrading and Repairing of PCs, Scott Muller*
3. *IBM PC and Clones, B. Govindrajalu*
4. *Microprocessor and Interfacing, D. V. Hall*
5. *Microprocessor X 86 Programming, Venugopal*
6. *Computer Motherboard Testing and Fault finding, S. K. Gupta*
7. *PC Hardware (A+ Certificate guide), Mike Mayer*
8. *PC Hardware interfaces, Michael Gook*

**Semester 2****Theory Lectures: 36****Objectives:**

- 1. To know about different interfaces of Computer*
- 2. To understand working of different chipsets and controller of Computer*
- 3. To understand different concepts of networking*
- 4. To understand different types of internet connection*

**Learning outcomes:****After completion of this course student will be able**

- 1. To identify the different ports of Computer and its specification*
- 2. To identify the different chipsets of Computer*
- 3. To identify the type of network topology*
- 4. To identify the thick and thin PC's*

**Unit 1: Chipset and Controllers:**

Introduction to Chipsets, working of Keyboard controller, Introduction to Super IO controller, Math Co processor, Clock Generator circuits, Bus controller, PPI (Parallel Port Interface), Timer, Interrupt controller, Tristate buffers and Latches

**Unit-2 Combinational Logic Circuits**

HDC, CRT Controller, HDMI

Serial and Parallel Interface, UART, RS-232, USB, Mini USB, Micro USB

Introduction to Bluetooth devices, Wifi

**Unit 3: Multimedia, Networking and Internet**

Networking: Concepts, Need, Types, Topologies, Internet Protocols

Introduction to Network Interface Card and Network Operating Systems,

Thick and Thin PC's, Virtual PC

Multimedia: Medium concept, Types, Multimedia Computer Systems.

Internet: Concept, Different Connection types, Applications.

**TEXT BOOKS AND REFERENCE BOOKS:**

1. Computer Fundamentals, P. K. Sinha
2. Upgrading and Repairing of PCs, Scott Muller
3. IBM PC and Clones, B. Govindrajalu
4. Microprocessor and Interfacing, D. V. Hall
5. Microprocessor X 86 Programming, Venugopal
6. Computer Motherboard Testing and Fault finding, S. K. Gupta
7. PC Hardware (A+ Certificate guide), Mike Mayer
8. PC Hardware interfaces, Michael Gook

**CHNA-123: CHNA LAB I-B (1.5 Credits)**

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The practical course consists of **10 experiments** out of which one will be activity equivalent to **2 practical** sessions. Activity will carry 15% marks at internal and external semester examination. Activity can be any one of the following:

**Activity**

- 1) Prepare and give a presentation after doing market survey using Power Point tools (comparative study) for the latest computer configuration.
- 2) Technical Data survey of Computer Hardware and network tools.

**Semester II List of Practical's (Minimum 08, 4 from each group):****Group A :( Minimum 4/6)**

- 1) Control panel settings of windows operating system.
- 2) Desk top settings of windows operating system.
- 3) Computer Troubleshooting.
- 4) Identification and verification and Detailed Study of Disc drives.
- 5) Study of Power Supply: Types, Concepts of Fuse, MCB, Stabilizer, UPS, SMPS.
- 6) Study of computer networks & topologies.

**Group B: (Minimum 4/6)**

- 1) Use of Internet, search engines and e-mail.
- 2) Setting IP addresses.
- 3) Installation of device drivers for Printer & Scanner.
- 4) Sharing files and folders.
- 5) Installation of Windows OS as a Desktop.
- 6) Installation of Linux OS as a Desktop.