Punjab Technical University

Jalandhar

Syllabus Scheme

(1st & 2nd Semester)

For

Advanced Diploma in Hardware & Networking Technologies

Implemented

From Aug. 2005 and onward

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STUDY SCHEME FOR
ADVANCED DIPLOMA IN HARDWARE & NETWORKING TECHNOLOGIES

SEMESTER-I

CODE	SUBJECT	L	P	TOTAL	MARKS	Marks	TOTAL MARKS
					INT.	EXT.	
ADHNT-101	Fundamentals of Information Technology & Operating Systems	30	30	60	25	75	100
ADHNT-102	Basics of Electronics & Microprocessor	28	14	42	25	75	100
ADHNT-103	PC Assembling & Troubleshooting	30	38	68	25	75	100
ADHNT-104	Programming in C	20	20	40	25	75	100
ADHNT-105	Communication & Soft Skills	30	0	30	50	0	50
ADHNT-106	Hardware Lab-I (PC Assembling & Troubleshooting)	-	-	-	25	75	100
TOTAL		**138**	**102**	**240**	**175**	**375**	**550**

SEMESTER-II

CODE	SUBJECT	L	P	TOTAL	MARKS	Marks	TOTAL MARKS
					INT.	EXT.	
ADHNT-201	Computer Networks	36	0	36	25	75	100
ADHNT-202	Windows 2003 Server Administration	42	42	84	25	75	100
ADHNT-203	Linux Administration	36	36	72	25	75	100
ADHNT-204	Database Administration	24	24	48	25	75	100
ADHNT-205	Software Lab- 1 (Windows 2003 Server & Linux)	-	-	-	25	75	100
TOTAL		**138**	**102**	**240**	**125**	**375**	**500**

Guidelines for Internal Assessment :
The internal marks will be based on a continuous assessment and the following is to be adhered to :

- Test/Quiz's (15 Marks). Best 2 out of 3.
- Presentation/Reports/Home assignments (5 Marks)
- Class attendance/General behaviour (5 marks)

Guidelines for External Practical / Viva-Voce :
The external practical /viva-voce will be conducted as per the details mentioned above in study scheme by an external examiner appointed by the University.

Semester-I

ADHNT-101 FUNDAMENTALS OF INFORMATION TECHNOLOGY & OPERATING SYSTEMS

INSTRUCTIONS FOR PAPER-SETTER

The question paper will consist of Two parts, A and B. Part A will have 15 short answer questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

INSTRUCTION FOR CANDIDATES
Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

Section I

Introduction
What is computer? Characteristics of Computers. How Computers evolved. Some earlier computers like Mark-I, EDVAC, EDVAC, EDSAC, UNIVAC. The five computer generations-key technologies, features and characteristics of each generation.

Basic Computer Organisation
Five basic operations of a computer. Block diagram showing basic organization of a computer system. Input Unit, Output Unit. Storage Unit: Primary storage, Secondary Storage. Arithmetic Logic Unit. Control Unit. Central Processing Unit. The System Concept. The Main Memory. Main Memory Organisation. Main Memory Capacity. RAM, ROM, PROM, EPROM, UVEPROM, EEPROM. Cache Memory.

Number Systems
Non-Positional Number Systems, Positional Number Systems: Binary, Octal, Hexadecimal number system, Converting from one number system to another.

Computer Arithmetic
Why binary numbers instead of decimal numbers. 7-bit ASCII Code. Binary arithmetic: Addition, Subtraction.

Section II

Secondary Storage Devices
Secondary Storage Devices: Limitations of primary storage, Sequential and Direct-Access Devices. Magnetic Disk, Basic principle of operation, Storage Organisation, Storage Capacity, Access mechanism, Access Time: Seek Time, Latency, Transfer Rate. Disk Formatting, Disk Drive, Disk Controller, Types of Magnetic Disks, Floppy Disks, Floppy-disk Drive, 3½-inch Floppy Disk, Hard Disks: Zip Disks, Disk Packs, Winchester Disk, Advantages and Limitations of Magnetic Disks, Uses of Magnetic Disks. Optical Disk, Basic principle of operation, Storage organization, Storage capacity,

Access Mechanism, Access Time, Optical Disk Drive, Types of Optical Disks: CD-ROM, WORM Disk, Advantages and Limitations of Optical Disks, Uses of Optical Disks

Input Devices

Keyboard. Point and Draw Devices: Mouse, Trackball, Joystick, Electronic pen, Touch Screen. Data Scanning Devices: Image Scanner: Flat-Bed and Hand-held Scanner, Optical Character Recognition Device, Optical mark reader, Bar-Code Reader, Magnetic-Ink Character Recognition. Digitizer. Electronic-card Reader. Voice Recognition Devices. Vision-Input System

Output Devices

Monitors Printers: Dot-Matrix Printers, Inkjet Printers, Laser Printers. Screen Image Projector. Voice Response Systems: Voice Reproduction System, Speech Synthesizer

Computer Software

What is Software? Relationship between Hardware and Software, Types of Software: System Software, Application Software, Functions of System Software, Type of System Software: Operating Systems, Language Translators, Utility Programs, Communications Software. Application Software, Commonly Used Application Softwares: Word Processing, Spreadsheet, Database, Graphics Personal Assistance, Education, Entertainment Software. Logical System Architecture showing relationship between hardware, system software, application software and users of a computer system. Firmware

Computer Languages

Analogy with natural languages, Machine Language, Advantages and Limitations of Machine Language, Assembly language: Assembler. Advantages of Assembly Language over Machine Language. Limitation of Assembly Language, High-Level Language: Compiler. Linker, Interpreter. Advantages and Limitations of High Level Languages, Some High Level Languages: Basic, Pascal, C, C++, Java.

Section III

Operating Systems

What is an Operating System? Main Functions of an Operating System. Measuring System Performance: Throughput, Turnaround time, Response time. Process Management: Process management in early systems. Multiprogramming: Requirements. Multitasking. Multiprocessing: Advantages and limitations. Difference between Multiprogramming and Multiprocessing. Timesharing: Requirements, Advantages. Memory management: Uniprogramming, Multiprogramming with fixed and variable number of memory partitions. Virtual memory: How is virtual memory realized? , Advantages and disadvantages of virtual memory. File management: File access methods-Sequential and Random access files, File operations, File naming. Command Interpretation: Command line interface, Graphical user interface. Some popular operating systems: Unix, MS-DOS, Microsoft Windows, Linux

The Internet

What is Internet? Brief History. Electronic mail. File Transfer Protocol. World Wide Web. WWW Browsers. Uses of the Internet

Classification of Computers

Notebook computers, Personal Computers, Workstations, Mainframe Systems, Supercomputers, Clients and servers.

ADHNT-102 BASICS OF ELECTRONICS & MICROPROCESSOR

INSTRUCTIONS FOR PAPER-SETTER

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INSTRUCTION FOR CANDIDATES
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Section I **Analog Electronics**

Basic Concepts of Electricity
Work and Energy, Matter and Electrons, Conductors, Insulators, Semiconductors, Electrical potential difference.
Electrical Terms
Voltage, Current, Resistance, Power, Efficiency, Ohm's law
The Electric Circuit and Voltage Generation
The need for a complete path, Basic circuit elements: Source, Control element, Switches, Relays, Load. Voltage rises and Voltage drops. The concept of ground. Circuit Problems : shorts, opens.
Resistors
Fixed resistors: Carbon composition resistors, Wirewound resistors, Resistor color code, Film type resistors. Variable resistors
Series Circuits
Two resistor circuit: Finding current values, Finding voltage drop values.
Parallel Circuits
Two resistor circuit: Finding current value in each branch.
Inductors and Capacitors
Inductors, Inductance, Capacitors, Capacitance, Capacitor ratings.
Alternating Current Terms
Amplitude, Period, Frequency, Wavelength, AC Waveforms.
Transformers
Principle, Turns ratio, Types of Transformers: Low frequency, Intermediate and Radio frequency transformers. Voltage step up and step down.
Semiconductors Materials and Rectifiers
Properties of Semiconductors, Commonly used semiconductors, Intrinsic Semiconductor, Extrinsic Semiconductor, PN Junction, Diode, Rectifiers (Half Wave, Full Wave, Bridge).
Tubes, Transistors and Integrated Circuits
Vacuum tubes, Vacuum tube diode, Amplification. Transistor: NPN and PNP schematic symbols. Transistor switches. Introduction to Integrated circuits.

Section II **Digital Electronics**

Boolean Algebra and Digital Circuits
Fundamental concepts of Boolean Algebra, Logic gates, Converting Boolean expression to Logic circuits.
Multiplexer and Demultiplexer
Digital Multiplexers/Data Selectors (4 to 1), Digital Demultiplexers (1 to 4).
Flip Flop Devices
Bistable device, What is a Flip-Flop, Working of RS Flip Flop, D Flip-Flop, J-K Flip-Flop.
Registers and Counters
Principle of Shift Registers, Working principle of Counters.

Section III **Introduction to Microprocessors**

Concept of bus: address bus, data bus, control bus, Block diagram showing the architecture of 8085 Microprocessor, Brief introduction of different units, Basic instructions (MOV, LDA, STA, ADD, SUB, INR), Introduction to assembly language using these basic instructions: Loading data, Moving data, Addition of two numbers.

ADHNT-103 **PC ASSEMBLY & TROUBLESHOOTING**

INSTRUCTIONS FOR PAPER-SETTER

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INSTRUCTION FOR CANDIDATES
Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

Section I

Components of a PC
Identifying the major components of a PC: System unit, Monitor, Keyboard, Mouse devices, Handling PC connections. Identifying the internal components of a PC: Opening a system unit, Handling expansion cards.
CPU
Identifying the right CPU for any motherboard : CPU manufacturers, Processor models, CPU speeds, Processor packages Installing and Upgrading CPUs. Heat Sink and Fan assembly.
RAM
What does RAM do, Types of RAM Technologies: SDRAM, DDRSDRAM, RDRAM, RAM Packages: SIMMS, DIMMS and RIMMS. Adding and Upgrading RAM.

Motherboard and BIOS
Common motherboard features, Types of Motherboards: AT, ATX, microATX, Proprietary Motherboards. Installing a motherboard. The System BIOS: Why do we need BIOS

Expansion Bus
Expansion Buses, Internal Buses: ISA, PCI, AGP, Installing a Plug and play Expansion Card, External Expansion Buses: USB.

Power Supplies and Cases
Case Form Factors: AT, ATX, miroATX, Power Supply: Wattage, Connectors. Cooling: Power supply Fan, Caser Fans.

Section II

Removable Media
Identifying, Installing and Troubleshooting Floppy Drives: How floppy drives work, Floppy Drive Cables, Installing a Floppy Drive, Bootable Floppy Disks.

Hard Drives
How hard drives store data: Partitions and File Systems. Installing a Hard Drive, Configuring a Hard Drive: Partitioning, Formatting. Hard Drive Maintenance and Troubleshooting: ScanDisk, Defragmentation, Disk Cleanup.

CD Media
Understanding CD Media Technologies: CD data storage, CD-ROM, Speeds, CD-R, CD-RW, DVD, Installing CD Media Drives, Using CD Media: Autoplay in Windows XP, Burning CDs. CD Media Troubleshooting: Drive problems, Disc problems..

Section III

Video
Selecting the right Monitor. CRTs: How CRTs work. LCDs: How LCDs work. Selecting the right video card: Graphics processor, Video RAM. Installing and configuring video software. Troubleshooting Monitor Problems: Fuzziness, Missing color, missing pixels, Dim screen, No image. Video Card Problems.

Input Devices
Installing a Keyboard, Connections: DIN, USB, Wireless. Mouse: Standard, Optical, Mouse connections.

Sound
How sound works in a PC, MIDI, Purchasing the right sound card: Processor capabilities, Speaker support, Recording quality. Installing a sound card in a Windows System, Troubleshooting Sound.

Printers
Identifying Current printer Technologies: Dot matrix, Inkjet, Laser. Installing a Printer on Windows PC, Performing basic Printer maintenance, Recognizing and fixing basic printing problems

ADHNT -104 **PROGRAMMING IN C**

INSTRUCTIONS FOR PAPER-SETTER

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questions (40-60 words) of 2 marks each. Part B will have 12 long answer questions of 5 marks each.

The syllabus of the subject is divided into 3 sections I, II and III. The question paper will cover the entire syllabus uniformly. Part A will carry 5 questions from each section and Part B will carry 4 questions from each section.

INSTRUCTION FOR CANDIDATES
Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

Section I

Structure of C Programming
Structure of a C Program, Execution of a C Program
Basic Elements
Character set, Identifiers and Keywords, Data Types, Constants, Variables, Declaration of Variables, Expressions, Statements, Overflow and underflow, Reading data from keyboard, Symbolic constants.
Operators and Expressions
Arithmetic operators, Integer arithmetic, Real arithmetic, Mixed mode arithmetic, Relational Operators, logical Operator, Assignment Operators, Increment and Decrement Operators, Conditional Operator. Arithmetic Expressions and their evaluation

Section II

Input and Output Operations
Reading a character, Writing a character, Formatted input and Output
Control Statements
if statement, switch statement, goto statement, while statement, do-while statement, for statement. Jumping in/out of a loop, Skipping part of a loop.
Arrays
One dimensional array, Two dimensional array, Multidimensional array.

Section III

Character Strings
Reading and Writing Strings, Arithmetic operators on Characters, Putting Strings together, Comparison of Two Strings, Functions for String handling: strcat, strcmp, strcpy, strlen
User Defined Functions
Advantages of User defined functions, Defining a function, Category of functions, Function Prototypes, Recursion, Function with arrays, Nested functions, variables in functions

Semester–II

ADHNT-201 **COMPUTER NETWORKS**

INSTRUCTIONS FOR PAPER-SETTER

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INSTRUCTION FOR CANDIDATES
Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

Section I

Basic Concepts
Components of Data Communication, Distributed processing, Standards and Organisations, Line Configuration, Topology and Types of Topology, Transmission Mode, Categories of Networks.
OSI and TCP/IP Models
What is Protocol, OSI Model, Layers and their functions. Transport Protocol: Introduction to TCP/IP, Internet Protocol. Protocols forming part of IP, Internet Upper-Layer Protocols: FTP, TELENT. Comparison of different models (TCP/IP vs. OSI Model)

Section II

Digital Transmission Interfaces and Modems
Types of Data: Digital Data, Analog Data., Data Transmission: Difference between digital data and analog data transmission, Digital to Analog conversion, Interfaces and Modems: DTC-DCE Interface. Modem: Analog Modem, Digital Modem, Asynchronous Modems, Cable Modem.
Transmission Media
Noise absorption, Radiation, Attenuation, Bandwidth. Guided and Unguided media. Comparison of media
Introduction to Signals
Analog and Digital Signals, Periodic and Aperiodic Signals, Time and Frequency domains. Composite signals.

Section III

LANS and MANS
Local area network: Advantages, disadvantage, characteristics. Metropolitan area network. IEEE 802, Ethernet : Physical layer, Physical layer interface, Data link layer, system configurations, 10Base-5, 10Base-2, 10Base-T, Physical network topology used

for Ethernet. Token passing Networks. Fiber distributed data interface for MANs. Switched multimegabit data services.

Switching

What is switched network? Circuit Switching, Packet switching, Message switching

Point to Point Protocols

What is remote access? RAS, Transmission states, Point to Point layers, Link control protocol, Authentication, Network control protocol.

ADHNT-202 WINDOWS 2003 SERVER ADMINISTRATION

INSTRUCTIONS FOR PAPER-SETTER

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INSTRUCTION FOR CANDIDATES

Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

Section I

Overview of MS Windows Server 2003 System Administration

Microsoft windows server 2003, Domain controllers and members servers, Understanding and using server roles, frequently used tools, Using control panel utilities, Using graphical administrative tools, Using command line utilities.

Managing Servers Running Windows Server 2003

Managing networked systems, connecting to other computers, sending console messages, using computer management system and storage tools, Working with services and applications, Managing System environments, profiles and properties, Managing hardware devices and drivers.

Section II

Monitoring Processes, Services and Events

Managing applications, processes and performance, Task manager, Administering applications and processes, Viewing and managing system performance and networking performance, Managing system services, Event logging and viewing, Monitoring server performance and activity, Why monitor your Server?, Getting ready to monitor, Using performance logs ,Viewing and replaying performance logs, Configuration alert for performance counters, Running scripts as actions, Tuning system performance, Monitor and tuning memory usage, processor usage, disk I/O.

Understanding User and Group accounts
The windows server 2003 security model, Differences between user and group accounts, Default user accounts and groups, Account capabilities, Using default group accounts.

Creating User and Group accounts
User account setup and organization, Configuring account policies, Configuring user rights policies, Adding a user account, Adding a group account, handling global group membership.

Section III

Working with Support Services and Remote Desktop
Introducing support services, Working with the automated help system, using the help and support center, introducing the application frame work, monitoring system health. Understanding and using automatic updates, an overview of automatic updates, configuring automatic updates, and update servers, downloading and installing automatic updates ,removing automatic updates to recover from problems, Managing remote access to servers, Configuring remote assistance and remote desktop access, Making remote desktop connections, Configuring windows time and window server 2003, enabling and disabling window time on stand – alone and member servers.

ADHNT-203 LINUX ADMINISTRATION

INSTRUCTIONS FOR PAPER-SETTER

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INSTRUCTION FOR CANDIDATES
Candidates are required to attempt all questions from Part A and 9 questions of Part B out of 12.

Section I

Installing Red Hat Linux
Starting the Red Hat Linux installer, Beginning the installation, Installation type, Disk partitioning setup, Disk setup, Boot loader configuration, Account configuration, Installing packages, Graphical interface configuration, Finishing first run configuration.

Navigating Linux at the Console
Understanding virtual consoles, Logging in a virtual console, Introducing the shell, Working with the filesystem, Linux file system, Home directory, Current working directory, manipulating files and directories, Understanding permissions.

Making the console work for you
Creating, Editing and Saving text files using vi, Using emacs to create text files, Grouping files for efficient file management, Searching files and directories quickly, Using pipes, Moving between multiple open applications.

Section II

Introducing the Red Hat Desktop
GNOME and KDE Environment, Logging in to desktop, Launching applications, Using window controls, working with multiple windows, Understanding virtual desktops.

Working with files on the desktop
Opening, editing and closing an existing file, Cutting, copying and pasting files, Duplicating a file, Renaming, Deleting items, Changing file permissions, Creating a new directory, Manipulating files using drag and drop, Working with trash contents.

Section III

Command Line System Administration
Using the su command, Managing system processes, Managing running services, Managing filesystems, Managing accounts.

Desktop System Administration
Managing system processes, Managing running services, Managing network interfaces, Managing accounts, Reading system logs, Mounting and unmounting filesystems

ADHNT -204 DATABASE ADMINISTRATION

INSTRUCTIONS FOR PAPER-SETTER

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INSTRUCTION FOR CANDIDATES
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Section I

Intro to Database and SQL Server 2000: Client/Server Concept, Types of Databases, Relational Vs. Flat File Database. Background of SQL Server, Versions of SQL Server and Clients Supported by SQL Server. Installation & Configuring SQL Server: Installing

SQL Server 2000, Unattended Installations, SQL Server Services. Configuring SQL Server Network Protocol Settings. Installing SQL Server Clients.

SQL Server Tools and Utilities: Managing SQL Server with Enterprise Manager, Query Analyser, SQL Server Groups. Tools Menu, Action Menu. Introduction to Transact – SQL(T-SQL)

Section II

Managing Database: Creating Database, Database File Placement(RAID 0, RAID 1 RAID 5), Creating Database using T-SQL and Enterprise Manager. Altering, Renaming, Dropping Database. Creating Objects in Database: Tables, Views, Constraints, Indexes.

Managing Security: Understanding Security Modes, Windows Authentication Modes, Mixed Mode, SQL Server Logins, Windows Logins, Fixed Server Logins, Creating Users, Database Roles, (Grant, Revoke, Deny) N-Tier Security.

Section III

Database Backups and Restore: Copying Database with Copy Database Wizard. SQL Database Backup Modes(Full, Differential, Transactional Log Backup). Backing Up of the Database. Restoring Database. DTS: Its meaning, DTS Packages. DTS Storage and Designer.

SQL Server Agent: Configuring Understanding Alerts, Jobs and Events. Creating Jobs: Multi Server Jobs, Creating, Editing and Deleting of Jobs. Optimization Techniques: Queries and Stored Procedure, Proper Indexing, Locks and Defragmentation.