



RAIPUR | INDIA

KALINGA UNIVERSITY

SCHEME & SYLLABUS FOR

Bachelor of Vocational Studies (B.Voc.)

Computer Hardware and Maintenance



Kalinga University, Naya Raipur, Chhattisgarh

B.VOC IN COMPUTER HARDWARE AND MAINTENANCE

Semester - I								
Course Code	Course Title	Credits	L	T	P	Internal Marks	End Semester Exam Marks	Total
BVCHM101	Communication Skills	3	3	0	0	30	70	100
BVCHM102	Fundamentals of Information Technology	3	3	0	0	30	70	100
BVCHM103	Computer Networks	3	3	0	0	30	70	100
BVCHM104	Basic Electronics	3	3	0	0	30	70	100
BVCHM105P	Industrial Training/ On Job Training/ Workshop	18	0	0	36	50	150	200
Total		30	12	0	36	170	430	600

Semester - II								
Course Code	Course Title	Credits	L	T	P	Internal Marks	End Semester Exam Marks	Total
BVCHM201	Fundamentals of Network Cabling-I	3	3	0	0	30	70	100
BVCHM202	Environmental Studies	3	3	0	0	30	70	100
BVCHM203	Digital Electronics	3	3	0	0	30	70	100
BVCHM204	Computer Peripheral and Devices	3	3	0	0	30	70	100
BVCHM205P	Industrial Training/ On Job Training/ Workshop	18	0	0	36	50	150	200
Total		30	12	0	36	170	430	600

Semester - III								
Course Code	Course Title	Credits	L	T	P	Internal Marks	End Semester Exam Marks	Total
BVCHM301	Routing and Switching	3	3	0	0	30	70	100
BVCHM302	Data Structures	3	3	0	0	30	70	100
BVCHM303	Computer Organization and Microprocessor	3	3	0	0	30	70	100
BVCHM304	Mobile Computing	3	3	0	0	30	70	100
BVCHM305P	Industrial Training/ On Job Training/ Workshop	18	0	0	36	50	150	200
Total		30	12	0	36	170	430	600

Semester - IV								
Course Code	Course Title	Credits	L	T	P	Internal Marks	End Semester Exam Marks	Total
BVCHM401	Information and Network Security	3	3	0	0	30	70	100
BVCHM402	Internet Routing Design	3	3	0	0	30	70	100
BVCHM403	Microprocessor and Interfacing Techniques- I	3	3	0	0	30	70	100
BVCHM404	Operating System	3	3	0	0	30	70	100
BVCHM405P	Industrial Training/ On Job Training/ Workshop	18	0	0	36	50	150	200
Total		30	12	0	36	170	430	600

Semester - V								
Course Code	Course Title	Credits	L	T	P	Internal Marks	End Semester Exam Marks	Total
BVCHM501	Network Administration	3	3	0	0	30	70	100
BVCHM502	Windows Server Administration	3	3	0	0	30	70	100
BVCHM503	Microprocessor and Interfacing Techniques- II	3	3	0	0	30	70	100
BVCHM504	Linux Operating System	3	3	0	0	30	70	100
BVCHM505P	Industrial Training/ On Job Training/ Workshop	18	0	0	36	50	150	200
Total		30	12	0	36	170	430	600

Semester - VI								
Course Code	Course Title	Credits	L	T	P	Internal Marks	End Semester Exam Marks	Total
BVCHM601	Wireless Networks	3	3	0	0	30	70	100
BVCHM602	Firewall Technology	3	3	0	0	30	70	100
BVCHM603	PC Assembling and Troubleshooting	3	3	0	0	30	70	100
BVCHM604	VMware Workstation	3	3	0	0	30	70	100
BVCHM605P	Industrial Training/ On Job Training/ Workshop	18	0	0	36	50	150	200
Total		30	12	0	36	170	430	600

Program Outcomes:

- Learn the proper techniques of maintenance of hardware and networking devices
- Study the science of hardware and networking
- Diagnose and repair all major problems regarding hardware, PC peripheral devices
- Build your own book of business
- Work as a system administrator

SEMESTER-01

BVCHM101

COMMUNICATION SKILLS

Course Objective:

- The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions. One of the critical links among human beings and an important thread that binds society together is the ability to share thoughts, emotions and ideas through various means of communication: both verbal and non-verbal. In the context of rapid globalization and increasing recognition of social and cultural pluralities, the significance of clear and effective communication has substantially enhanced.

Course outcomes:

- The purpose of this course is to introduce students to the theory, fundamentals and tools of communication
- To develop vital communication skills which should be integral to personal, social and professional interactions.
- One of the critical links between human beings.
- An important thread that binds society together is the ability to share thoughts, emotions and ideas through various means of communication: both verbal and non-verbal.
- In the context of rapid globalization and increasing recognition of social and cultural pluralities, the significance of clear and effective communication has substantially enhanced.

Unit 1:

06

- **Introduction:** Theory of communication, types and modes of communication, mediums and channels of communication, barriers to communication, English as a global language, the lingua franca, social influences on English.

Unit 2:

06

- **Language of Communication:** Verbal and non-verbal (spoken and written) personal, social and business barriers and strategies intra-personal, inter-personal and group communication, varieties of English, language, accent, dialect, colloquialism, historical influences on English

Unit 3:

06

- **Speaking Skills:** Monologue dialogue group discussion effective communication/mis-communication interview public speech, regional influences on English, convergence and divergence, linguistic imperialism

Unit 4:

06

- **Reading and Understanding** Close reading, reading analysis of a text - audience and purpose, content and theme, tone and mood, stylistic devices, structure comprehension- analysis and interpretation translation(from Indian language to English and vice-versa) literary/knowledge texts

Unit 5:

06

- **Writing Skills:** Documenting report writing making notes letter writing, writing tabloids, diary entry, open letters, essays, newsletter and magazine articles, skits, short stories, impersonating characters it will enhance language of communication, various speaking skills such as personal communication, social interactions and communication in professional situations such as interviews, group discussions and office environments, important reading skills as well as writing skills such as report writing, note taking etc. while, to an extent, the art of communication is natural to all living beings, in today's world of complexities, it has also acquired some elements of science. it is hoped that after studying this course, students will find a difference in their personal and professional interactions.

References:

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr. Ranjana Kaul, Dr. Brati Biswas

BVCHM102

FUNDAMENTALS OF INFORMATION TECHNOLOGY

Course objective:

- This is a basic course for commerce students to familiarize with computer and its applications in the relevant fields and exposes them to other related courses of IT.

Course Outcomes:

- Gain a foundational understanding of key IT concepts, including hardware, software, and networks.
- Develop proficiency in using common computer applications, such as word processing and spreadsheet software.
- Explore the ethical and security considerations in IT, emphasizing responsible digital behavior.
- Acquire problem-solving skills by applying IT knowledge to real world scenarios.
- Prepare for further studies in IT or related fields by establishing a strong IT knowledge base.

Unit-1:

06

- **Computer characteristics:** Speed, storage, accuracy, diligence; digital signals, binary system, ASCII; historic evolution of computers;
- **Classification of computers:** microcomputer, minicomputer, mainframes, supercomputers;
- **Personal computers:** desktop, laptops, palmtop, tablet; hardware & software; von Neumann model.

Unit-2:

06

- **Hardware:** CPU, memory, input devices, output devices.
- **Memory units:** RAM (SDRAM, DDR RAM, RDRAM etc. feature wise comparison only); ROM-different types: Flash memory;
- **Auxiliary storage:** Magnetic devices, optical devices; floppy, hard disk, memory stick, CD, DVD, CD/DVD-Writer;
- **Input devices** - keyboard, mouse, scanner, speech input devices, digital camera, touch screen voice input, joystick, optical readers, bar code reader;
- **Output devices:** Display device, size and resolution; CRT, LCD, LED;
- **Printers:** Dot-matrix, inkjet, laser; plotters, sound cards & speaker.

Unit-3: **06**

- **Software:** System software, application software; concepts of files and folders, introduction to operating systems, different types of operating systems: single user, multitasking, time-sharing multi-user; booting, POST;
- **Basic features of two GUI operating systems:** Windows & Linux (Basic desk top management); Programming Languages, Compiler, Interpreter, Databases;
- **Application software:** Generic features of word processors, spread sheets and presentation software; generic introduction to latex for scientific typesetting; utilities and their use; computer viruses & protection, free software, open source.

Unit-4: **06**

- **Computer Networks and Internet:** Connecting computers, requirements for a network: server, workstation, switch, router, network operating systems; internet: brief history, world wide web, websites, URL, browsers, search engines, search tips; internet connections: isp, dial-up, cable modem, well, dsl, leased line wireless and Wi-Fi connectivity ; email, email software features (send receive, filter, attach, forward, copy, blind copy); characteristics of web-based systems, web pages, web programming languages.

Unit-5: **06**

- **Information Technology and Society:** Indian IT Act, intellectual property rights, issues. application of information technology in railways, airlines, banking, insurance, inventory control, financial systems, hotel management, education, video games, telephone exchanges, mobile phones, information kiosks, special effects in movies.
- **Programming Concepts & Techniques:** Program concept, characteristics of programme, stages in program development, tips for program designing, programming aids, algorithms, pseudo code, notations, design, flowcharts, symbols, rules, compiler & interpreter. introduction to programming techniques, top-down & bottom-up approach, unstructured, & modular programming, cohesion, coupling, debugging, syntax & logical errors, linking and loading, testing and debugging, documentation.

References:

1. Programming in C, R.S. Salaria, Khanna Publishing House
2. Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing House
3. Handbook of Computer Fundamentals, N.S. Gill, Khanna Publishing House

BVCHM103

COMPUTER NETWORKS

Unit 1: **08**

- Introduction to Data Communication and Computer Networks; Uses of Computer Networks; Types of Computer Networks and their Topologies; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; OSI Reference Model; TCP/IP Model;

Unit 2: **08**

- **Analog and Digital Communications Concepts:** Analog and Digital data and signals; Bandwidth and Data Rate, Capacity, Baud Rate; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Modems and modulation techniques;

Unit 3: **07**

- **Data Link Layer Design issues; Error Detection and Correction methods; Sliding Window Protocols:** One-bit, Go Back N and Selective Repeat; Media Access Control: ALOHA, Slotted ALOHA, CSMA, Collision free protocols; Introduction to LAN technologies: Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet; Token Ring; Introduction to Wireless LANs and Bluetooth;

Unit 4: **07**

- **Routing Algorithms:** Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control; Traffic shaping; Choke packets; Load shedding; Application Layer: Introduction to DNS, E-Mail and WWW services; Network Security Issues: Security attacks; Encryption methods; Firewalls; Digital Signatures;

References:

- Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks", Pearson Education, 2013.
- Michael A. Gallo, Bill Hancock and William M. Hancock, "Computer Communications and Networking Technologies", Brooks/Cole, 2001.
- Behrouz A Forouzan, "Data Communications and Networking (SIE)", McGraw Hill, 2017.
- Bhushan Trivedi, "Computer Networks", Oxford University Press, 2012.

BVCHM104

BASIC ELECTRONICS

Course Objectives:

- Basic electronics enable the students to learn about Analog electronics technologies, their implementation, uses, circuit tracing, troubleshooting and maintenance.

Unit 1:

08

- **Current Electricity:** Definition of Resistance, Voltage, Current, Power, Energy and their units, Relation between electrical and mechanical units, Temperature variation of resistance, Difference between AC and DC voltage and current.
- **D.C. Circuits:** Ohm's Law, Series – parallel resistance circuits, calculation of equivalent resistance.

Unit 2:

08

- **Capacitors:** Capacitor and its capacity, Concept of charging and Discharging of capacitors, Types of Capacitors and their use in circuits.
- **Overview of Atom, Sub-Atomic Particles and CRO:** Brief History of Electronics. Atom and its elements, Electron, Force, Field intensity, Potential, Energy, current Electric field, Magnetic field, Motion of charged particles in electric and magnetic field. Overview of Multimeter and CRO.

Unit 3:

07

- **Voltage and Current:** Resistance, Ohm's law, V-I Characteristics, Resistors, Inductors. Voltage and Current sources, Symbols and Graphical representation, Overview of AC, DC, Cells and Batteries, Energy and Power.
- **Basics of Semiconductor:** Semiconductor materials, Metals and Semiconductors. N-type and P-type semiconductor, Effects of temperature on Conductivity of semiconductor. PN junction diode, depletion layer, Forward & Reverse bias, V-I Characteristic, Effects of temperature, Zener diode, Photo diode, LED, Types and applications of diode. Diode as a rectifier, Half wave and full wave rectification, Zener diode Regulator. Introduction to Filters.

Unit 4:

07

- **Bipolar Junction Transistor:** Operation of NPN and PNP transistors, Biasing of BJT. CB, CE and CC configuration. Introduction to FET, JFET, MOSFET, CMOS and VMOS

References:

1. Fundamentals of Electrical and Electronics, B.L. Thereja
2. Principles of Electronics, V.K Mehta

BVCHM105P
**INDUSTRIAL TRAINING/ON JOB TRAINING/
WORKSHOP**

SEMESTER-02

BVCHM201

FUNDAMENTALS OF NETWORK CABLING-I

Unit 1:

08

- **Introduction to Data Cabling:** The Golden Rules of Data Cabling, The Importance of Reliable Cabling, The Legacy of Proprietary Cabling System, Cabling and the Need for Speed, Cable Design, Data Communications, Reasons of Data Slow down, Near-End Crosstalk(NEXT), Far End Crosstalk(FEXT), Equal-Level-Far-End Crosstalk(ELFEXT), Pair to-Pair Crosstalk, Power-Sum Crosstalk, External Interference, Attenuation-to-Crosstalk Ratio(ACR), Propagation Delay, Delay Skew, The future of Cabling Performance.

Unit 2:

08

- **Cabling Specifications and Standards:** Structured Cabling and Standardization, ANSI/TIA/EIA-568-B Purpose and Scope, ISO/IEC 11801, Anixter Cable performance Levels Program, Other Cabling Technologies.
- **Choosing the Correct Cabling:** Topologies, UTP, Optical Fiber and Future Proofing, Network Architectures, Network Connectivity Devices.

Unit 3:

07

- **Cable System and Infrastructure Constraints:** Origin of Codes, The National Electrical Code, Knowing and Following the Codes, Cabling System Components: The Cable, Wall Plates and Connectors, Cabling Pathways, Wiring Closets.
- **Tools of the Trade:** Building a Cabling Tool Kit, Common Cabling Tools, Cable Testing, Cabling Supplies and Tools, Tools That a Smart Data-Cable Technician Carries, A Preassembled Kit.

Unit 4:

07

- **Copper Cable Media:** Types of Copper Cabling, Copper Cable for Data Applications, Copper Cable for Voice Applications, Testing, Connectors: Twisted-Pair Cable Connectors, Coaxial Cable Connectors, Fiber-Optic Cable Connectors, Fiber-Optics Media: Introduction to Fiber-Optic Transmission, Advantages and Disadvantages of Fiber Optic Cabling, Types of Fiber-Optic Cable, Fiber Installation Issues. Unbounded (Wireless) Media: Infrared Transmission, Advantage of Infrared, Radio Frequency (RF) Systems, Microwaves Communications.

References:

1. David Barnett, David Groth and Jim McBee, Cabling: The Complete Guide to Network Wiring, Sybex, 2008.
2. Bill Woodward and Andrew Oliviero, Cabling: The Complete Guide to Copper and Fiber-Optic Networking , Sybex, Fourth Edition, March 2014.

BVCHM202

ENVIRONMENTAL STUDIES

Course Outcomes:

- Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
- Master core concepts and methods from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.

Unit 1:

06

Introduction to Environmental Studies:

- Multidisciplinary nature of environmental studies, Scope and importance; concept of sustainability and sustainable development.

Ecosystems:

- What is an ecosystem? Structure and function of the ecosystem;
- **Energy flow in an ecosystem:** food chains, food webs and ecological succession.
- **Case studies of the following ecosystems:** Forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit-2:

06

Natural Resources:

- **Renewable and Non--renewable Resources:** Land resources and land use change; Land degradation, soil erosion and desertification.
- **Deforestation:** Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- **Water:** Use and over--exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter--state).
- **Energy resources:** Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit-3: 06

Biodiversity and Conservation:

- **Levels of biological diversity:** genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots, India as a mega--biodiversity nation; Endangered and endemic species of India
- **Threats to biodiversity:** Habitat loss, poaching of wildlife, man--wildlife conflicts, biological invasions;
- **Conservation of biodiversity:** In--situ and Ex--situ conservation of biodiversity.
- **Ecosystem and biodiversity services:** Ecological, economic, social, ethical, aesthetic and Informational value.

Unit-4: 06

Environmental Pollution:

- Types, causes, effects and controls; Air, water, soil and noise pollution, Nuclear hazards and human health risks
- **Solid waste management:** Control measures of urban and industrial waste. Pollution case studies.

Environmental Policies & Practices:

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture
- **Environment Laws:** Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
- Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

Unit-5: 06

Human Communities and the Environment:

- **Human population growth:** Impacts on environment, human health and welfare. Resettlement and rehabilitation of project affected persons; case studies.
- **Disaster management:** floods, earthquake, cyclones and landslides.
- **Environmental movements:** Chipko, Silent valley, Bishnois of Rajasthan.
- **Environmental ethics:** Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

References:

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
4. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science*, 339: 36--37.
7. McCully, P. 1996. *Rivers no more: the environmental effects of dams*(pp. 29--64). Zed Books.
8. McNeill, John R. 2000. *Something New Under the Sun: An Environmental History of the Twentieth Century*.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. *Environmental and Pollution Science*. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. *Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. *Environmental law and policy in India*. Tripathi 1992.
14. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
18. Warren, C. E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.
20. World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.

BVCHM203

DIGITAL ELECTRONICS

Course Objectives:

- Digital electronics enable the students to learn about Digital electronics technologies, their implementation, uses, circuit tracing, troubleshooting and maintenance.

Unit 1:

08

- **Number Systems and Boolean algebra:** Basics of Analog and Digital. Boolean algebra, De-morgan's law, Truth tables. Logical
- **Circuits Logic gates:** AND, OR, NOT, NOR, NAND, XOR, XNOR.

Unit 2:

08

- **Combinational Circuits:** Arithmetic Circuits: Half adders, Full adders, Half Subtractor, Full Subtractor,
- **Data Processing Circuits:** Encoders, Decoders, Multiplexers, De-Multiplexers.

Unit 4:

07

- **Latches and Flip-Flops:** Concept of Latches, Types of Latches, SR latch. SR Flip Flop, JK Flip Flop, D Flip flop, T Flip Flop, Master Slave J-K Flip Flop. Introduction to counters, Types of counters, Asynchronous and Synchronous. Introduction to shift registers, types of shift registers.

Unit 4:

07

- **Introduction to Display Devices:** LED, LCD, 7 segment display Integrated Circuits and Memories, Introduction to IC's, Importance and applications, Linear and Digital IC's. Introduction to SSI, MSI, LSI and VLSI (Terminology & Definitions). Memory Organisation and Operations, RAM, ROM, PROM, EPROM, EEPROM.

References:

1. Digital Circuits and Logic Design, S.Salivahanan
2. Digital Electronics, S.Salivahanan
3. Digital computer electronics, Malvino and Brown

BVCHM204

COMPUTER PERIPHERAL AND DEVICES

Course Objectives:

- This paper enables the students to repair different IO devices like keyboard, Mouse, Monitor, Printer, Joystick, Scanner etc.

Unit 1:

08

- **Keyboard:** Types of keyboard, correcting problems, vacuum cleaners and keyboards, keyboard maintenance, Mouse: Mouse basics, working with a mouse, performing mouse actions, inside the mouse, adjusting mouse properties, mouse keys, mouse maintenance, Optical mouse, breakdown and break through.

Unit 2:

08

- **Monitors:** basic, VGA, DVI, viewable area, maximum resolution and dot pitch, power consumption, flat panel, monitor resolution, colour depth, degaussing, power option for monitor, display option for monitor, monitor maintenance.

Unit 3:

07

- **Printers:** printer characteristics, type quality, print speed, impact vs nonimpact, and fonts. Inkjet printers: common features, operations, parts of inkjet printer, control panel, trays, cartridges, cleaning cartridges, replacing cartridges, clearing paper jams.
- **Laser Printers:** common features, operations, technology, control panel, trays, output bin, cartridges, redistributing toner, internal cleaning, paper jams, cancel printing jobs, setting preferences and defaults of printing, breakdown and break through.

Unit 4:

07

- **Other I/O Devices:** Demo on Joy Stick, Web Cam, Pen drive and Digital pad. Scanner

References:

1. Modern All about Printer, Lotia
2. Modern All about Keyboard and Mouse, Lotia
3. Modern TFT & LCD Monitor Introduction and Troubleshooting, BPB Publication

BVCHM205P
**INDUSTRIAL TRAINING/ON JOB TRAINING/
WORKSHOP**

SEMESTER-03

BVCHM301

ROUTING AND SWITCHING

Unit 1:

08

- **Router:** Introduction, components of routers, Types of Routers: Broadband Routers, Wireless Routers, Edge Router, Subscriber Edge Router, Inter-provider Border Router, Core Router, Wired and Wireless Routers. Functions of routers, router modes,
- **Configuration of Router:** names, passwords, password encryption, interfaces name, creating a login banner, saving configuration and erasing configuration.

Unit 2:

08

- **Routing:** Introduction, Types of routing: Static and dynamic routing, Static routing: Configuring a static route, Static routes and Administrative distance, Configuring default route. Dynamic routing: Dynamic Routing Protocols: RIPv1, RIPv2, IGRP, EIGRP and OSPF.
- **Delivery Semantics:** Unicast, Anycast, Multicast, Broadcast, Geocast. Configuring and Verifying RIP, IGRP, OSPF, EIGRP.

Unit 3:

07

- **Switch:** Introduction, Roles of switches in network, Types of switches: Managed and Unmanaged Switch. Working of switch in different layers.
- **Configuration of Switch:** Command Mode, Setting Host Names, Setting Passwords, Setting IP Addresses and Default Gateways, Setting Operational Speed, Switch Port Security, Sticky MAC Addresses.

Unit 4:

07

- **Switching:** Introduction, Switching Services, Bridging vs LAN Switching, Switch Functions at Layer 2, Definition of Spanning Tree Protocol (STP), Operations of STP, STP Port States, Definition of VLAN,
- **Typing of VLAN:** Static and Dynamic, VLAN Identification Methods, VLAN Trunking Protocol (VTP), VTP Modes of Operation, Routing between VLANs, Configuring Inter-VLAN Routing.

References:

1. Raymond Lacoste and Kevin Wallace, CCNP Routing and Switching TSHOOT 300 - 135: Official Cert Guide, Pearson India ,2015
2. Todd Lammle, CCNA Routing and Switching Study Guide, Wiley India Pvt Ltd, 2nd Edition, 2016
3. Richard Deal, CCNA Cisco Certified Network Associate Study Guide, Mcgraw Hill Education, 3rd Edition, 2017.
4. Vikas Gupta, Comdex Hardware and Networking Course Kit, Dreamtech Press, 2014.
5. Toby J. Velte and Anthony T. Velte, Cisco a Beginner's Guide, Fifth Edition, McGraw-Hill Education, 2013
6. Bobbi Sandberg, Networking: The Complete Reference 3rd Edition, McGraw Hill Education, 2015.

BVCHM302

DATA STRUCTURES

- Unit 1:** **08**
- **Introduction to Data Structures:** Elementary Data Organization, Data Structure Operations, Algorithm Complexity and Time-space Tradeoff, Classification of Data Structures.
 - **String Processing:** Storing Strings, String Operations, Pattern Matching Algorithms.
 - **Arrays:** Linear Arrays, Operations on Arrays, Multidimensional Arrays, Storage of Arrays, Matrices, Sparse Matrices.

- Unit 2:** **08**
- **Linked Lists:** Representation of Linked List in Memory, Traversal, Searching, Insertion, Deletion, Sorted Linked List, Header List, Two-way List. Stacks, Queues, Linked and Array Representation of Stacks, Queues, and Dequeues, Priority Queues, Operations on Stacks and Queues.

- Unit 3:** **07**
- **Applications of Stacks:** Recursion, Polish Notation, Quick Sort.
 - **Trees:** Binary Trees, Representation of Binary Trees in Memory, Threaded Binary Trees, Balanced Tree, Different Tree Traversal Algorithms,
 - **Binary Search Tree:** Searching, Insertion, and Deletion in a Binary Search Tree, Heap Sort.

- Unit 4:** **07**
- **Representation of Graphs and Applications:** Adjacency Matrix, Path Matrix, Shortest Path Algorithm, Linked Representation of a Graph, Traversing a Graph.
 - **Sorting and Searching:** Linear Search, Binary Search, Insertion Sort, Selection Sort, Bubble Sort, Radix Sort, Merge Sort.

References:

1. Seymour Lipschutz, Data Structures(SIE), Mc Graw Hill India; 1st edition, 2014.
2. Aaron M. Tanenbaum, Yedidyah Langsam and Moshe J. Augenstein, Data Structures using C, Prentice Hall of India Pvt. Ltd., New Delhi, 2009
3. J.P. Tremblay and P.G. Sorenson, An Introduction to Data Structures with Applications, McGraw Hill Education, 2017.
4. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Pearson Education India, 2002.

BVCHM303

COMPUTER ORGANIZATION AND MICROPROCESSOR

- Unit 1:** **08**
- **Introduction and Concepts:** Hardware and Software, System Software, Application Software, Firmware, BIOS, OST sequence, Operating Systems, Program, Flow Charts, Loader, assembler, Compiler, Linker, Editor, Simulator, Emulator, Debugger, Device Drivers, Software Packages and Programming Languages
- Unit 2:** **08**
- **Computer Hardware Storage Devices:** Magnetic Tape, Floppy Disk, CD/DVD, Hard Disk, SSD (Pen drive) etc.
 - **Types of Card used in Computer System:** Motherboard, Controller card, Display card, Sound card, AGPS, Fax / Modem cards, TV Tuner, Ethernet cards.
- Unit 3:** **07**
- **Printer & types of Printer:** Dot Matrix, Inkjet, LASER, Thermal, Plotter, and Barcode Printers, Sound devices (Speaker, Headphone, Bluetooth, and dongle) Details of Printer & Working of Different printer, DVD, CD-ROM & other Hardware Devices.
- Unit 4:** **07**
- **Microprocessor Study 8086:** Architecture, Instruction set, 80286, 80386, and 80486. Introduction to advanced processors- i series

References:

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

BVCHM304

MOBILE COMPUTING

Unit 1: **08**

- **Mobile Communications:** An Overview: Mobile Communication, Mobile Computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks, Data Dissemination, Mobility Management,
- **Security Mobile Devices and Systems:** Mobile Phones, Digital Music Players, Handheld Pocket Computers, Handheld Devices

Unit 2: **08**

- **Operating Systems, Smart Systems, Limitations of Mobile Devices, Automotive Systems GSM and Similar Architectures:** GSM-Services and System, Architecture, Radio Interfaces, Protocols, Localization, Calling Handover, Security, New Data Services, General Packet Radio Service, High-speed Circuit Switched Data, DECT

Unit 3: **07**

- **Wireless Medium Access Control and CDMA based Communication:** Medium Access Control, Introduction to CDMA-based Systems, Spread Spectrum in CDMA Systems, Coding Methods in CDMA, IS-95 cdma One System, IMT- 2000,i-mode , O F D M , Mobile IP Network Layer.

Unit 4: **07**

- IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunnelling and Encapsulation Route Optimization, Dynamic Host Configuration Protocol, Mobile Transport Layer, Conventional TCP/IP Transport, Layer Protocols, indirect TCP, Snooping TCP, Mobile TCP, Other Methods of TCP-layer Transmission for Mobile Networks, TCP Over 2.5G/3G Mobile Networks

References:

1. Mobile Computing, Raj Kamal, Oxford University Press
2. Mobile Communications Jochen Schiller, Addison-Wesley.
3. Handbook of Wireless Networks and Mobile Computing, Stojmenovic and Cacute, Wiley,
4. Mobile Computing Principles: Designing and Developing Mobile
5. Applications with UML and XML, Reza Behravanfar, Cambridge University Press

BVCHM305P
**INDUSTRIAL TRAINING/ON JOB TRAINING/
WORKSHOP**

SEMESTER-04

BVCHM401

INFORMATION AND NETWORK SECURITY

Unit 1: **08**

- Introduction Management of malicious intent, threat scenarios, critical infrastructures, security targets and policies, security mechanisms, examples of applications and their different security requirements, multi-lateral security, privacy and data protection, computer misuse legislation, Operating system and network security. Cyber laws.

Unit 2: **08**

- **Network Layer Security Routing algorithm vulnerabilities:** route and sequence number spoofing, instability and resonance effects. Information hiding: DMZ networks, route aggregation and segregation ICMP redirect hazard: denial of service. ARP hazard: phantom sources, ARP explosions and slow links.

Unit 3: **07**

- **Firewalls Network partitioning, firewall platforms, partitioning models and methods, Secure SNMP, Secure routing interoperability:** virtual networks (DARTnet/CAIRN). Transparent and opaque network services. Source masking and hidden channels.

Unit 4: **07**

- **Security in Wireless Networks:** How it is different, Methods and procedures, MIN/ESN, shared secret data authentication, Token based, public key based.

References:

1. Stallings, W., "Cryptography and Network Security: Theory and Practice", Second Edition, John Wiley
2. Schneier, B., "Applied Cryptography - Protocols, Algorithms, and Source Code in C", Second Edition. John Wiley and Sons, 1995
3. Stein L., "Web Security: A Step-by-Step Reference Guide", Addison Wesley Longman, Inc., 1998
4. Anderson R., "Security Engineering: A Guide to Building Dependable Distributed Systems", Wiley
5. Cheswick W., Bellovin S. , "Firewalls and Internet Security: Repelling the Wily Hacker", 2nd ed., Addison-Wesley

BVCHM402

INTERNET ROUTING DESIGN

- Unit 1:** **08**
- **Networking and Network Routing:** An Introduction , Addressing and Internet Service: An Overview, Network Routing, IP Address subnetting, Service Architecture, Protocol Stack Architecture, Router Architecture, static, dynamic routing
- Unit 2:** **08**
- Routing Algorithms and types, states. Implementation of RIP v1,2 and its configuration. Implementation of EIGRP and its configuration.
 - **Routing Protocols:** Framework and Principles Routing Protocol, Routing Algorithm, and Routing Table, Routing Information Representation and Protocol Messages, Distance Vector Routing Protocol, Link State Routing Protocol, Path Vector Routing, Protocol, Link Cost
- Unit 3:** **07**
- **OSPF and Integrated IS-IS : OSPF:** Protocol Features, OSPF Packet Format, Integrated IS-IS,
- Unit 4:** **07**
- Manageable switch, switching concept, states & modes of switches, looping in switch, Spanning tree protocol, V-LAN, implementation of VLAN.
- References:**
1. **Network Routing:** Algorithms, Protocols, and Architectures Deepankar Medhi and Karthikeyan Ramasamy (Morgan Kaufmann Series in Networking)
 2. **Network Algorithmic:** An Interdisciplinary Approach to Designing Fast Networked Devices George Varghese (Morgan Kaufmann Series in Networking)

BVCHM403

MICROPROCESSOR AND INTERFACING TECHNIQUES-I

Unit 1: **08**

- **Motherboard Configuration:** Motherboard (Installation, Configuration and Troubleshooting): Types of motherboards, History, Parts of Motherboard, and Installation of motherboard, Installation of SMPS, Processor, BIOS Setup & information, Diagnosis of motherboard.

Unit 2: **08**

- **Installation:** Installation of I/O & Other Devices: Keyboard, Mouse, CD/ DVD drives, HDD, Installation of different types of operating system.
- **Advanced Technology in Computers:** Server, client, Mainframe, Desktop, Notebook, Tablets etc.

Unit 3: **07**

- **Computer, Microcomputers & Microprocessors:** An Introduction & Overview Structure & Operation, Specification of new processors: Intel Processors: Dual Core, Core i3/i5/i7 Family, Intel 2nd, 3rd & 4th Generation Processors, Xeon Processors.
- **Non-Intel Processors:** Advanced Micro Devices (AMD), ARM based Processors, iMAC, (Apple Macintosh), Advanced Systems BUS Architecture PCI, IDE, USB 2.0 & 3.0, ATA, SATA, eSATA, HDMI Interrupts & Interrupt Applications of 8086 Processor Software Interrupt Applications.

Unit 4: **07**

- **Memories and EDA Tools:** The 8086 Max Mode, DMA Transfers, Interfacing & Refreshing DRAMs, Cache Memory Concepts, Computer Based design & Development Tools.

References:

1. Assembly Language for PC John Socha, Peter Norton
2. Microprocessor and Interfacing- D.V. Hall
3. The 8086 Microprocessor Programming and Interfacing the PC K. Ayala
4. Programming with X86 processor Venugopal

BVCHM404

OPERATING SYSTEM

Unit 1: **08**

- **Introduction:** operating system, architecture, functions, characteristics, historical evolution, types: Serial batch, multiprogramming, time sharing, real time, distributed and parallel. OS as resource Manager.
- **Computer system structures:** I/O structure, storage structure, storage hierarchy.
- **Operating system structure:** system components, services, system calls, system programs, system structures.

Unit 2: **08**

- **Process management:** process concepts, process state, process control block, operations, process scheduling, inter process communication.
- **CPU Scheduling:** scheduling criteria, levels of scheduling, scheduling algorithms, multiple processor scheduling.
- **Deadlocks:** Characterization, methods of handling, deadlock detection, prevention, avoidance, recovery.

Unit 3: **07**

- **Storage Management: memory management of single- user and multiuser operating system,** partitioning, swapping, paging and segmentation, virtual memory, Page replacement Algorithms, Thrashing.
- **Process synchronization:** critical section problems, semaphores. Mutual exclusion

Unit 4: **07**

- **Device and file management:** Disk scheduling, Disk structure, Disk management, File Systems: Functions of the system, File access and allocation methods,
- **Directory Systems:** Structured Organizations, directory and file protection mechanisms.

References:

1. A. Silberschatz, P.B. Galvin, and G. Gagne, "Operating System Concepts", Wiley, 2017.
2. A.S. Godbole and A. Kahate, Operating Systems, McGraw Hill Education, 2017.
3. H.M. Deitel, P.J. Deitel and D.R. Choffnes, "Operating Systems", Pearson Education India, 2007.
4. A.S. Tanenbaum and A.S. Woodhull, "Operating System- Design and Implementation", Pearson, 2006.

BVCHM405P
**INDUSTRIAL TRAINING/ON JOB TRAINING/
WORKSHOP**

SEMESTER-05

BVCHM501

NETWORK ADMINISTRATION

Unit 1: **08**

- **Backing UP and Restoring IOS Software and Configuration:** Boot system commands, IOS file system, backing up configuration to a TFTP server, restoring configuration to a TFTP server, backing up the IOS software to a TFTP server, restoring/upgrading the IOS software from a TFTP server, restoring IOS software from ROM Monitor mode using Xmodem.

Unit 2: **08**

- **Password- Recovery Procedures and Configuration Register:** The configuration register: A visual representation, bit eans, The boot field, Console terminal baud rate setting, Console line speed: CLI & ROM Monitor mode, password recovery procedures for router, Password recovery procedures for switches.

Unit 3: **07**

- **Basic troubleshooting:** Viewing routing table, Determining the Gateway of last resort, Last routing update, OSI layer 3 esting, OSI layer 7 testing, Interpreting the show interface command, Using CDP to troubleshooting, show controllers command debug commands, Time stamps, Operating system IP verification commands, the ip http server command, netstat command.

Unit 4: **07**

- **Security Device Manager:** SDM connecting with CLI and GUI, SDM Express Wizard with no CLI pre-configuration, resetting the router to factory defaults, SDM user interfaces, Configuration routing using SDM, SDM monitor mode, SDM to configuration a router as a DHCP server & client, SDM configuration NAT/PAT.

References:

1. Richard Deal, CCNA Cisco Certified Network Associate Study Guide, Mcgraw Hill Education, 3rd Edition, 2017.
2. Troy McMillan, Cisco Networking Essentials, Sybex, 2015.
3. Vikas Gupta, Comdex Hardware and Networking Course Kit, Dreamtech Press, 2014.
4. William Stallings, Cryptography and Network Security: Principles and Practice, Pearson Education, 2017
5. Toby J. Velte and Anthony T. Velte, Cisco a Beginner's Guide, Fifth Edition, McGraw-Hill Education, 2013
6. Bobbi Sandberg, Networking: The Complete Reference 3rd Edition, Mcgraw Hill Education, 2015.

BVCHM502

WINDOWS SERVER ADMINISTRATION

Unit 1:

08

- **Network Operating Systems:** Windows Server Editions, Linux, Unix, Terminal services: Dumb terminals, terminal server configuration, windows server as terminal server, advantages of terminal services.
- **Windows Server:** different ways to install network operating system, pre-installation requirements, Maintaining AD DS, Managing User and Service Accounts, Implementing a Group Policy Infrastructure, Managing User Desktops with Group Policy, Installing, Configuring, and Troubleshooting the Network Policy Server Role.

Unit 2:

08

- **Installing and Configuring a Network Policy Server:** Implementing Network Access Protection, Implementing Remote Access, Implementing Direct Access by Using the Getting Started Wizard, Deploying an Advanced Direct Access Solution, Implementing VPN, Implementing Web Application Proxy, Optimizing File Services, Configuring Quotas and File Screening Using File Server Resource Manager, Implementing Distributed File System, Configuring Encryption and Advanced Auditing, Deploying and Maintaining Server Images, Using Windows Deployment Services to Deploy Windows Server, Implementing Update Management, Monitoring Windows Server

Unit 3:

07

- **Microsoft Windows Server:** Deploying and Managing Windows Server, Introduction to Active Directory Domain Services, Installing Domain Controllers, Managing Active Directory Domain Services Objects, Automating Active Directory Domain Services Administration, Implementing Dynamic Host Configuration Protocol, Implementing DNS, Implementing Local Storage, Implementing File and Print Services.

Unit 4:

07

- **Windows Security:** Firewalls, Spyware, viruses, User accounts security, Search strategies System performance, Troubleshooting tools, Windows registry,
- **Administering Windows Server:** Configuring and Troubleshooting Domain Name System, Configuring and Troubleshooting DNS, Maintaining Active Directory Domain Services.

References:

1. Windows Server Administration Fundamentals by Microsoft Official Academic Course, 2015
2. Darril Gibson, Microsoft Windows Networking Essentials 1st Edition, Sybex, 2011.
3. Tom Carpenter, Microsoft Windows Server Administration Essentials, Sybex, 2011.
4. Kris Jamsa, Rescued by Windows, Course technology Inc., 1993.

BVCHM503

MICROPROCESSOR AND INTERFACING TECHNIQUES-II

Unit 1:	08
Digital & Analog Interfacing:	
<ul style="list-style-type: none">• Programmable parallel Ports & Handshake Input Output.• Interfacing Microprocessors to Keyboard, Interfacing to Alphanumeric Displays.• Sensors and Transducers.• DAC & ADC Converters: Specifications & Types, Interfacing & Types of Interfacing	
Unit 2:	08
New Standards:	
<ul style="list-style-type: none">• Green PC: Introduction, Advantages, Thick & Thin concept. Introduction to N-Computing Concept and devices,• Multimedia PC: Introduction, Minimum Requirements, MPEG Terminology, Enhanced Devices & interfaces, Sound Cards, MIDI Ports.• Displays: Display Adaptors, Display Systems• Controllers: Peripheral Controllers, System Controllers, Memory Controller, Disk Drive Controller• BIOS: Legacy, Flash BIOS, Embedded IO systems Introduction to win8/Android/IOS	
Unit 3:	07
Computer Systems peripherals:	
<ul style="list-style-type: none">• Micro Computer Displays<ul style="list-style-type: none">• Input Devices: Keyboards, Mouse, Scanners, Card Readers etc.• Output Devices: Printers, Displays, Plotters etc.• Storage Devices: Magnetic Disks, Optical Disk Data Storage, Flash Drives etc.• Various ADD ON Cards. (Graphics Card, Wireless NIC, Ethernet Card, Audio)	
Unit 4:	07
Communications:	
<ul style="list-style-type: none">• Speech Synthesis and Recognition Concepts.• Introduction to Asynchronous Data Communications• Serial Data Communication Methods & Standards.• Synchronous Serial Data Communication & Protocols• Concepts of Personal Area Network (PAN), Local Area network (LAN) & Wide Area Network (WAN)• Introduction to Wireless Communication Concepts & Protocols• Study of Remote Desktop Sharing Tools	

References:

1. Assembly Language for PC John Socha, Peter Norton
2. Microprocessor and Interfacing- D.V. Hall
3. The 8086 Microprocessor Programming and Interfacing the PC K. Ayala
4. Programming with X86 processor Venugopal
5. Information System Control and Audit Ron Weber.
6. PC Hardware (A+ Certificate guide) by Mike Mayer
7. PC Hardware interfaces by Michael Gook
8. Computer Fundamentals by P. K. Sinha
9. Upgrading and Repairing of PCs by Scott Muller
10. IBM PC and Clones by B. Govindrajalu

BVCHM504

LINUX OPERATING SYSTEM

Course Objectives:

- This course enables students to get familiar with Linux system, its commands, files & directories, shell programming, and system administration. Student will learn to work in the Linux environment and administrate the Linux machine.

Unit 1:

08

- **Introduction:** Linux Operating System, features, Basic Architecture, features of Kernel and Shell. Linux File system - Boot block, super block, Inode table, data blocks, How Linux kernel access files, Linux standard file system. Structure of file system, Essential Linux commands - Commands for files and directories : cat, cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, file comparisons – cmp & comm, View files, disk related commands, checking disk free spaces, chmod with its options, cal, date, who, tty, lp, stty.

Unit 2:

08

- **Filters and pipes:** head, tail, wc, pr, cut, paste, sort, uniqe, grep, egrep, fgrep, tee. The process : shell process, parent and children ,process status, system process, multiple jobs in background and foreground, changing process priority with nice, premature termination of process, Mathematical commands- bc, expr, factor, units.

Unit 3:

07

- Creating and editing files with VI editor with their command options, Operators, text deletion, text movement, changing text, yanking text, filtering text, the ex-mode, moving text from one file to another.
- **Communication:** The bulletin board –news, write, mesg, talk, mail, elm, pine, finger, vacation and connecting to remote machine.

Unit 4:

07

- **System administration Common administrative tasks, identifying administrative files** – configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Installation of Linux system– Linux Installation requirement, complete Procedure steps, Partitioning the Hard drive, System startup and shut-down process, init and run levels. File system mounting, lpstat, backup strategy, installing software on Linux.

References:

1. Tim Parker: Linux Unleashed, Techmedia Publishing House.
2. Norton, P.: Complete guide to LINUX, Techmedia.
3. Komarinski, M.: LINUX System Administration Handbook, AW.
4. John Goerzen: Linux Programming Bible, IDG Books, New Delhi.
5. Venkateshmurthy, M.G.: Introduction to UNIX & Shell Programming, Pearson Education.
6. Tery Dawson, Gregor N. Purdy, Linux Network Administration Guide, O'Reilly.

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SEMESTER-06

BVCHM601

WIRELESS NETWORKS

- Unit 1:** **08**
- **Introduction to Wireless Networks Architecture** - Characteristics, Applications, Issues, Wireless vs. Wired Networks, Circuit Switched Networks and Packet Switched Networks in Details.
 - **Multiple Radio Access** - Medium Access Alternatives, Fixed-Assignment for Voice Oriented Networks, Random Access for Data Oriented Networks, Hand-off and Roaming Support.
- Unit 2:** **08**
- **Cellular Network Generations**- GSM, CDMA, GPRS with its Architectures and Application Areas.
 - **Wireless LANs** - Introduction to Wireless LAN (IEEE-802.11)-Architecture, Services, Physical layer, MAC Sub Layer, MAC management Sub-Layer, Other IEEE 802.11 standards, HIPERLAN, Wi-Max standard.
- Unit 3:** **07**
- **Ad-Hoc Networks** - Introduction, Issues in Ad-Hoc Wireless Networks, Ad-Hoc Wireless Internet, Ad-Hoc vs Wireless Networks.
 - **MAC Protocol** - Issues in Designing a MAC Protocol for Ad-Hoc Wireless Networks, Design Goals of a MAC Protocol for Ad-Hoc Wireless Networks, Classification of MAC Protocols.
- Unit 4:** **07**
- **MANET Routing Protocols** – Types of MANET Protocol (On Demand Protocol, Table-Driven and Hybrid Protocols), Wireless Sensor Networks Classification, MAC and Routing Protocols. Wireless MANs and PANs,
 - **Wireless MAN**- Physical and MAC Layer Details, Wireless PAN-Architecture of Bluetooth Systems, Physical, MAC Layer Details, Standards, Examples of Wireless Network Standards.
- References:**
1. C.Siva Ram Murthy and B.S. Manoj, Ad-Hoc Wirelss Networks: Architecture and Protocol, Pearson Education India, 2006.
 2. Andrew S. Tanenbaum and David J. Wetherall, Computer Networks, Pearson Education, 2013.
 3. William Stallings, Data and Computer Communications, Pearson Education, 2017.

BVCHM602

FIREWALL TECHNOLOGY

- Unit 1:** **08**
- **Firewall:** Introduction, Need of Firewall, Working of Firewall, Network Layer Firewall, Application Layer Firewall, Windows Firewall, Types of firewall: Hardware and Software Firewalls,
 - **Firewall Filtering Techniques:** Packet Filter, Application Gateway, Circuit-level Gateway, Proxy Server.
 - **Installation of Firewall:** key functions during installation, special options during installation, installing UTM, Basic Configuration, Backup Restoration.
- Unit 2:** **08**
- **Web Admin:** Web Admin Menu Button bar, lists searching in lists, dialog boxes, buttons and icons, Object lists.
 - **Dashboard:** Dashboard settings, Flow monitor, Management: System settings, Organizational, Hostname, Time and date, Scan Settings, Reset configuration or passwords. Web admin settings: general, Access control, User rights HTTPs Certificate, User preferences, Licensing, Backup/Restore, User portal, Notifications, Hardware and Software requirements, Status system status configuration, Shutdown and Restart.
- Unit 3:** **07**
- **Definitions & Users:** Network definitions, MAC address definitions, Service definitions, Time period definitions, Users and Groups, Global Settings Interfaces and Routing;
 - **DNS:** Global, forwarders, Request routing, Static entries, DynDNS, DHCP: Servers, Relay, DHCPv6 Relay, Static Mappings, IPv4 table,
 - **Network Protection:** Firewall, Rules, Country Blocking, Country Blocking Exceptions, ICMP, NAT: Masquerading, Advanced Threat Protection,
 - **Intrusion Prevention:** Global attack patterns, Anti-Dos/Flooding, Anti-Port scan, Exceptions, Server Load Balancing: Balancing Rules
- Unit 4:** **07**
- **Web Protection: Web filtering:** Some key differences, Common tasks, migration, Global, Https, Policies: Filter action wizard, Categories, Websites, Downloads, Antivirus, Web filter Profile: Filter profiles, Filter actions, parent proxies,
 - **Filtering options:** Exceptions, Websites, Bypass users, Potentially unwanted applications categories, Logging & Reporting: View Log Files, Today's Log Files, Archived Log Files, Search Log Files, Hardware Daily, Weekly, Monthly, Yearly.

References:

1. D. Hucaby, D. Garneau & A. Sequeira, CCNP Security FIREWALL 642-618 Official Cert Guide, Pearson India, 2012.
2. D. Burns, O. Adesina, K. Barker, CCNP Security IPS 642-627 Official Cert Guide, Pearson India, 2012.
3. S. Wilkins, F. H. Smith, CCNP Security Secure 642-637 Official Cert Guide, Pearson Education, 2011.
4. Dameon D Welch-Abernathy, Essential Check Point Firewall-1 NG: An Installation, Configuration, and Troubleshooting Guide, Addison Wesley, 2004.

BVCHM603

PC ASSEMBLING AND TROUBLESHOOTING

Unit 1:

08

- **Components of PC:** Identifying the Major Components of a PC: System Unit, Monitor, Keyboard, Mouse Devices, and Handling PC Connections.
- **Identifying the Internal Components of a PC:** Opening a System Unit, Handling Expansion Cards.
- **Identifying the Right CPU for Any Motherboard:** CPU Manufacturers, Processor Models, CPU Speeds, Processor Packages Installing and Upgrading CPUs, Heat Sink and Fan Assemble.
- **Ram Packages:** SIMMs, DIMMs and RIMMs, Adding and Upgrading Ram.

Unit 2:

08

- **Motherboard:** Common Motherboard Features, Installing a Motherboard.
- **Expansion Bus:** Expansion Buses, Internal Buses: ISA, PCI, AGP. Expansion Card, External Expansion Buses: USB.
- **Power Supply:** Wattage, Connectors, Common Power Supply problems.
- **Cooling:** Power Supply Fan, Case Fans.

Unit 3:

07

- **Sound:** Working of Sound 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.
- **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, Disk Problems.

Unit 4:

07

- **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.

References:

1. Craig Zacker and John Rourke, PC Hardware: The Complete Reference, McGraw-Hill, 2001.
2. Stephen J. Bigelow, Troubleshooting, Maintaining, Repairing PC's, McGraw Hill Education, 2017.
3. B. Govindarajalu, IBM PC and Clones: Hardware, Troubleshooting and Maintenance, McGraw Hill Education, 2002.
4. Ron Gilster, PC hardware a Beginners Guide, McGraw-Hill Education, 2001.

BVCHM604

VMWARE WORKSTATION

Unit 1: 08

- **Installing Workstation:** Installing Workstation Basics, Installing Debuggers, Upgrading Workstation, Workstation Window Tour, Setting Workstation Preferences, Getting Help, Finding Your License Key, Creating Virtual Machines, Preparing to Create a VM, Understanding Memory Options, Understanding Page Faults, Understanding Virtual Disk, Understanding Virtual Disk Options, Creating a VM, Working with Easy Install, Installing a Guest OS, Installing a Guest OS , Virtualizing a Physical Machine, Importing Virtual Machines, Importing Virtual Box VMs, Installing VMware Tools, VM Files, VMDK File Names

Unit 2: 08

- **Using Virtual Machines:** Starting a Virtual Machine, Stopping a Virtual Machine, Stopping a Virtual Machine, Resuming a Virtual Machine, Closing VMs and Exiting Workstation, Drag / Drop / Cut / Paste, Shared Folders, Mapping a Virtual Disk, Adding a Printer, Using Removable Devices, Removable Devices and Lost Data, VM Snapshot Overview, Creating Snapshots, Snapshot Best Practices, Installing New Software, Recording a VM, deleting a VM, Goodbye Teams Hello Folders, Converting a Team

Unit 3: 07

- **Manage and Configure VMs:** Workstation Display Preferences, Unity Mode, Encrypting VMs, Moving VMs, Understanding the UUID, Understanding Cloning, Cloning VMs, Changing Hardware Compatibility, Exporting VMs.
- **Configuring Devices:** Configuring DVDs, Configuring USB Controllers, Managing the VHD, Compacting the VHD, Expanding the VHD, Defragmenting the VHD, The Virtual Disk Manager, Configuring Keyboard Features

Unit 4: 07

- **VM Networking:** Understanding VM Networking, Common Network Configurations, Changing Default Network Configuration, Understanding Bridged Networking, Understanding NAT, Understanding Host-Only Networking, Add a Virtual Network Adapter, Modify a Virtual Network Adapter, Disconnect a Virtual Network Adapter, Configure Bandwidth and Packet Loss, VM MAC Addresses, Changing MAC Addresses
- **Sharing and Remoting:** Understanding Workstation Server, Shared Virtual Machines, Connecting to a Remote Server.

References:

1. Brian Ward, Book of VMware: The Complete Guide to VMware Workstation, No Starch Press, 2002
2. Steven S. Warren, The VMware Workstation 5 Handbook, Charles River Media Networking & Security Series, Charles River Media, 2005.
3. Dannielle Ruest and Nelson Ruest, Virtualization: A Beginner's Guide, McGraw-Hill Education, 2009

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