

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY



CIRCULAR NO.SU/Sci./B.Sc.Hard.& Net./05/2019

It is hereby inform to all concerned that, on the recommendation of the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor **has accepted the "Revised Syllabus of B.Sc. Hardware and Networking Third Year (Vth & VIth semester)** under the Faculty of Science & Technology in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

This shall be effective from the Academic Year 2019-2020 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO. SU/Sci/2019/1581-91
Date:- 16.08.2019.

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**Deputy Registrar,
Syllabus Section.**

Copy forwarded with compliments to :-

- 1] **The Principals, affiliated concerned Colleges,
Dr. Babasaheb Ambedkar Marathwada University.**
- 2] **The Director, University Network & Information Centre, UNIC,
with a request to upload this Circular on University Website.**

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- 1] The Director, Board of Examinations & Evaluation,
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- 8] The Record Keeper.

**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD.**



Revised Syllabus of

B.Sc. Hardware and Networking

UNDER THE FACULTY OF SCIENCE & TECHNOLOGY.

[Effective from 2019-20 & onwards]

CODE NO.	TITLE OF PAPER	MAXIMUM MARKS		
FIFTH SEMESTER		UNIVERSITY EXAMINATION	Examination Duration Hrs	Theory / Practical (hrs/week)
HW501-T	CCTV-I	50	2	3
HW502-T	Embedded System I	50	2	3
HW503-T	Advance Networking	50	2	3
HW504-T	VHDL (VHSIC Hardware Description Language) -II	50	2	3
HW505-T	PCB Design and Fabrication	50	2	3
HW506-T	Red Hat System Administration- I	50	2	3
HW507-P	Practical Based on HW501-T	50	1 ½	6
HW508-P	Practical Based on HW502-T	50	1 ½	6
HW509-P	Practical Based on HW504-T	50	1 ½	6
HW510-P	Practical Based on HW505-T	50	1 ½	6

HW501-T	CCTV-I
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Unit 1:

IP Surveillance Overview:

Introduction to CCTV, Overview Network Cameras, Introduction, Camera Types, Video Servers, Network Video Recorders, Central Management Software, Evolution of Video Surveillance, Applications

Lens and Image Sensor Technology:

Lens, Focal Length, Iris, Lens Mount Types, Image Sensor, Sensor Types, Resolutions, Sensor Scan Modes, Wide Dynamic Range, Lens and Image Sensor Considerations, Lens Form Factors for Image Sensor, View Angle, Day and Night

Unit 2:

Video and Audio Compression:

Video Compression, MJPEG, MPEG-4, H.264, Audio Compression, G.711, AMR, AAC, Video and Audio Streaming Multiple Streams, Two-way Audio

IP Network:

Network Types, Network , IP Address, Network Protocols, Device Connection, Transmission Protocols , Video Transmission Methods, Event Notification, Timing Correction, Video Quality Control, Wireless Networks, WiFi , 3GPP, WiMAX , Security, IP Filtering , Username and Password, Security Protocols, Security Wireless Transmission, PoE

Unit 3:

Camera Housing and Mounting:

Design, Flowchart, Site Survey, Housing, Vandal-proof, Weather-proof, Covering, Mounting, Scanner, Equipment Selection, System Design Proposal Including Site Plan, Video transmission capability (including wireless)

Text Books:

1. Planning, design, installation and operation of CCTV surveillance systems code of practice and associated guidance, BSIA, Issue 4, July 2014
2. IP Surveillance Handbook, VIVOTEK USA, INC.
3. Introduction to CCTV, Yale Training Guide, An ASSA ABLOY Group Brand
4. IP Surveillance 101 Training Guide, D-Link for Business (<http://www.ipsurveillance.dlink.com>)
5. Installation and Operations Manual, DS-SC-IOM-201211V01, 2016, Infinique Worldwide Inc (<http://www.infinique.com>)
6. Practical and Theoretical Guide to Closed Circuit Television (CCTV) destruction and subversion. (<http://www.schnews.org.uk/diyguide/guidetoclosedcircuittelevisioncctvdestruction.htm>)

HW502-T	Embedded System I
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Unit 1: The 8051 Microcontrollers

Microcontrollers and embedded processors, Overview of the 8051 family, 8051 ASSEMBLY LANGUAGE PROGRAMMING: Inside the 8051, Introduction to 8051 Assembly programming, Assembling and running an 8051 program, The program counter and ROM space in the 8051, 8051 data types and directives, 8051 flag bits and the PSW register, 8051 register banks and stack

Unit 2: Jump, Loop, And Call Instructions

Loop and jump instructions, Call instructions, Time delay for various 8051 chips, I/O PORT PROGRAMMING: 8051 I/O programming, I/O bit manipulation programming. 8051 ADDRESSING MODES: Immediate and register addressing modes, Accessing memory using various addressing modes, Bit addresses for I/O and RAM, Extra 128-byte on-chip RAM in 8052.

Unit 3: Arithmetic & Logic Instructions

Arithmetic instructions, Signed number concepts and arithmetic operations, Logic and compare instructions, Rotate instruction and data serialization, BCD, ASCII, and other application programs. 8051 PROGRAMMING IN C: Data types and time delay in 8051 C, I/O programming in 8051 C, Logic operations in 8051 C, Logic operations in 8051 C, Data conversion programs in 8051 C, Accessing code ROM space in 8051 C, Data serialization using 8051 C.

Textbooks /References:

1. The 8051 Microcontroller and Embedded system Mazidi, Mohmad Ali; Janice, Gelispe and Mckinlay, Roline D. Pearson /Prentice Hall, 2nd edition, Delhi, 2008, ISBN: 9788177589030
2. 8051 Microcontroller Architecture, Programming and Application Ayala, Kenneth EEE/Prentice Hall of India, 2nd edition, New Delhi, 1 July 2004, ISBN: 9781401861582
3. Microcontroller Principle and Application Pal, Ajit Prentice Hall of India, New Delhi, 2014, ISBN: 9788120343924
4. Microcontroller Theory and Application Deshmukh, Ajay McGraw Hill Education, New Delhi, 2011, ISBN: 9780070585959
5. Microcontroller Architecture Programming, Interfacing and System Design Rajkamal Pearson Education India, Delhi, 2012, ISBN: 9788131759905
6. The Embedded Software Primer David E. Simon Addison-Wesley ISBN: 9780201615692

HW503-T

Advance Networking

Unit 1: Network Infrastructure Design

Physical Network Design, Core, Distribution Layer, Access Layer, Data Flow, Selecting the Media, IP SUBNET DESIGN, IP Address Range, Determining the Number of Subnetworks Needed for the Network, Determining the Size or the Number of IP Host Addresses Needed for the Network, IP Assignment VLAN NETWORK , Virtual LAN (VLAN), VLAN Configuration, VLAN Tagging, 802.1Q Configuration, Networking Challenge: Static VLAN Configuration, Configuring the HP Procurve Switch, ROUTED NETWORK, Router, Gateway Address, Network Segments, Multilayer Switch, Layer 3 Routed Networks, Routed Port Configuration, InterVLAN Routing Configuration, Serial and ATM Port Configuration

Unit 2: Advanced Router Configuration-I

Configuring Static Routing, Gateway of Last Resort, Configuring Static Routes, Load Balancing and Redundancy, Networking Challenge—Static Routes, Dynamic Routing Protocols, Distance Vector Protocols, Link State Protocols,

Unit 3: Advanced Router Configuration-II

Configuring RIPv2, Configuring Routes with RIP, Configuring Routes with RIP Version 2, Networking Challenge—RIP, TFTP—Trivial File Transfer Protocol, Configuring TFTP, Configuring Link State Protocols: Link State Protocols, Configuring Routes with OSPF, Load Balancing and Redundancy with OSPF, Networking Challenge—OSPF, CONFIGURING Link State Protocols—IS-IS, Configuring Routes with IS-IS, Load Balancing and Redundancy with IS-IS
Networking Challenge: IS-IS

Text Books:

1. A Practical Guide to Advanced Networking by Jeffrey S. Beasley And Piyasat Nilkaew, 2013 by Pearson Education, Inc.
2. Computer Networking : Principles, Protocols and Practice Release 0.25 by Olivier Bonaventure, The Saylor Foundation

References:

1. Tools for Teaching Computer Networking and Hardware Concepts by Nurul I. Sarkar, Information Science Publishing, 2006

HW504-T

VHDL (VHSIC Hardware Description Language) -II

Unit 1: Introduction to Digital System Design

Introduction, Device technologies, Fabrication of an IC, Classification of device technologies, Comparison of technologies, System representation , Levels of Abstraction, Transistor-level abstraction, Gate-level abstraction, Register-transfer-level (RT-level) abstraction, Processor-level abstraction Development tasks and EDA software, Synthesis, Physical design, Verification, Testing, EDA software and its limitations, Development flow, Flow of a medium-sized design targeting FPGA Flow of a large design targeting FPGA Flow of a large design targeting ASIC

Unit 2: Concurrent Signal Assignment Statements of VHDL

Combinational versus sequential circuit's Simple signal assignment statement, Syntax and examples Conceptual implementation, Conditional signal assignment statement, Syntax and examples, Conceptual implementation, detailed implementation examples, Syntax and examples, Conceptual implementation Detailed implementation examples Conditional signal assignment statement versus selected signal assignment statement, Signal assignment statement with a closed feedback loop, selected signal assignment statement, Conversion between conditional signal assignment and selected signal assignment statements Comparison between conditional signal assignment and selected signal assignment statements

Unit 3: Combinational/ Sequential Circuit Design: Practice

Derivation of efficient HDL description, Operator sharing, Functionality sharing, Layout-related circuits, General circuits, Poor design practices and their remedies, Counters, Registers as temporary storage, Pipelined design

Text Books: RTL HARDWARE DESIGN USING VHDL Coding for Efficiency, Portability, and Scalability by PONG P. CHU, A JOHN WILEY & SONS, INC., PUBLICATION, 2006

HW505-T	PCB Design and Fabrication
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UNIT I: Introduction to PCB

- Definition and Need/Relevance of PCB
- Background and History of PCB
- Types of PCB
- Classes of PCB Design
- Terminology in PCB Design
- Different Electronic design automation (EDA) tools and comparison

UNIT II: PCB Design Process

- PCB Design Flow, Placement and routing
- Steps involved in layout design
- Artwork generation Methods - manual and CAD
- General design factor for digital and analog circuits
- Layout and Artwork making for Single-side, double-side and Multilayer Boards.
- Design for manufacturability
- Design-specification standards

UNIT III: Introduction to PCB Fabrication & Assembly

- Steps involved in fabrication of PCB.
- PCB Fabrication techniques-single, double sided and multilayer
- Etching: chemical principles and mechanisms
- Post operations- stripping, black oxide coating and solder masking
- PCB component assembly processes

UNIT IV: Transmission lines and crosstalk

- Transmission Line: Transmission lines and its effects, Significance of Transmission line in Board design, Types of Transmission lines.
- Crosstalk: The crosstalk in transmission lines, Crosstalk control in PCB design parts, planes, tracks, connectors, terminations, Minimization of crosstalk.
- Thermal issues: Thermal mapping of design

UNIT V: Example RC Circuit

- Schematic Design: Familiarization of the Schematic Editor, Schematic creation, Annotation, Netlist generation
- Layout Design: Familiarization of Footprint Editor, Mapping of components, Creation of PCB layout Schematic
- Create new schematic components
- Create new component footprints

References / Textbook

1. Printed Circuit Board by RS Khandpur, Tata McGraw Hill Education Pvt Ltd., New Delhi
2. Electronic Product Design Volume-I by S D Mehta, S Chand Publications
3. Open source EDA Tool KiCad Tutorial
4. PCB Fabrication user guide

HW506-T

Red Hat System Administration-I

Unit 1: System Locale and Keyboard Configuration

Setting the System Locale, Changing the Keyboard Layout, Configuring the Date and Time, Using the `timedatectl` Command, Using the `date` Command, Using the `hwclock` Command, Managing Users and Groups, Introduction to Users and Groups, Managing Users in a Graphical Environment, Using Command-Line Tools, Access Control Lists, Gaining Privileges

Unit 2: Subscription and Support

Registering the System and Managing Subscriptions: Registering the System and Attaching Subscriptions, Managing Software Repositories, Removing Subscriptions, Additional Resources, Accessing Support Using the Red Hat Support Tool: Installing the Red Hat Support Tool, Registering the Red Hat Support Tool Using the Command Line,

Using the Red Hat Support Tool in Interactive Shell Mode, Configuring the Red Hat Support Tool, Opening and Updating Support Cases Using Interactive Mode, Viewing Support Cases on the Command Line

Unit 3: Installing and Managing Software

Yum: Checking For and Updating Packages, Working with Packages, Working with Package Groups, Working with Transaction History, Configuring Yum and Yum Repositories, Yum Plug-ins

Infrastructure Services:

Managing Services with `systemd`, Introduction to `systemd`, Managing System Services, Working with `systemd` Targets, Shutting Down, Suspending, and Hibernating the System, Controlling `systemd` on a Remote Machine, Creating and Modifying `systemd` Unit Files, OpenSSH, The SSH Protocol, Configuring OpenSSH, OpenSSH Clients, More Than a Secure Shell TigerVNC, VNC Server, Sharing an Existing Desktop, VNC Viewer

Text Books:

Red Hat Enterprise Linux 7 System Administrator's Guide, Deployment, Configuration, and Administration of Red Hat Enterprise Linux 7 By Jaromír Hradílek, Douglas Silas, Stephen Wadeley, et.al., 2015

HW507-P	Practical Based on HW501-T Any 10 practical's based on Syllabus
HW508-P	Practical Based on HW502-T Any 10 practical's based on Syllabus
HW509-P	Practical Based on HW504-T Any 10 practical's based on Syllabus
HW510-P	Practical Based on HW505-T Any 10 practical's based on Syllabus

CODE NO.	TITLE OF PAPER	MAXIMUM MARKS		
SIXTH SEMESTER		UNIVERSITY EXAMINATION	Examination Duration Hrs	Theory / Practical (hrs/week)
HW601-T	CCTV-II	50	2	3
HW602-T	Embedded System II	50	2	3
HW603-T	Routers and Switches	50	2	3
HW604-T	Virtualization and Cloud Computing	50	2	3
HW605-T	Fundamentals of IPv6	50	2	3
HW606-T	Red Hat System Administration- II	50	2	3
HW607-P	Practical Based on HW601-T	50	1 ½	6
HW608-P	Practical Based on HW602-T	50	1 ½	6
HW609-P	Major Project	50	1 ½	6
HW610-P	Seminar	50	1 ½	6

HW601-T

CCTV-II

Unit 1: Bandwidth and Storage

Bandwidth Management, Assessing Demands, Calculation, Storage, Assessing Demands, Storage Media, Redundancy, Cables, RAID

Video Management

Video Management Platforms, PC-based, NVR-based, Basic Features of Software, Monitoring, Recording, Playback, Management, Advanced Features, E-map, Auto-backup, Failure Report, Digital I/O Devices, Digital Input Devices, Digital Output Devices, Managing Large Systems

Unit 2: System Design

Identifying Customer Needs, Viewing Considerations, Environmental Considerations, System Planning, Camera Considerations, Hardware Considerations, Software Considerations, Installation and Checks, On-site Installation, Post-installation Checks, Operational Training, System Maintenance, Training of operators to gain effective use, Procedures for data protection and authorization of access, Incident Response, Recording quality and storage/retention time

Unit 3: Intelligent Video Systems

Introduction, Architecture, Centralized Platform, Distributed Platform, Advantages of Distributed Architecture, Detection, Tamper Detection, Intelligent Motion Detection, Loitering Detection, License Plate Recognition, People Counting, Databases, Exporting recordings

Text Books:

1. Planning, design, installation and operation of CCTV surveillance systems code of practice and associated guidance, BSIA, Issue 4, July 2014
2. IP Surveillance Handbook, VIVOTEK USA, INC.
3. Introduction to CCTV, Yale Training Guide, An ASSA ABLOY Group Brand
4. IP Surveillance 101 Training Guide, D-Link for Business (<http://www.ipsurveillance.dlink.com>)
5. Installation and Operations Manual, DS-SC-IOM-201211V01, 2016, Infinique Worldwide Inc (<http://www.infinique.com>)
6. Practical and Theoretical Guide to Closed Circuit Television (CCTV) destruction and subversion. (<http://www.schnews.org.uk/diyguide/guidetoclosedcircuittelevisioncctvdestruction.htm>)

HW602-T

Embedded System II

Unit-I: 8051 HARDWARE CONNECTION AND

Pin description of the 8051, Design and test of DS89C4x0 trainer, explaining the Intel hex file, 8051 Timer Programming in Assembly and C: Programming 8051 timers, Counter programming, Programming timers 0 and 1 in 8051 C.

Unit-II: 8051 SERIAL PORT PROGRAMMING IN ASSEMBLY AND C

Basics of serial communication, 8051 connection to RS232, 8051 serial port programming in Assembly, Programming the second serial port, Serial port programming in C. Interrupts Programming in Assembly and C: 8051 interrupts, Programming timer interrupts, Programming external hardware interrupts, Programming the serial communication interrupt, Interrupt priority in the 8051/52, Interrupt programming in C.

Unit-III: LCD AND KEYBOARD INTERFACING

LCD interfacing, Keyboard interfacing, Parallel and serial ADC 374, DAC interfacing, Sensor interfacing and signal conditioning.

Textbooks /References:

1. The 8051 Microcontroller and Embedded system Mazidi, Mohmad Ali; Janice, Gelispe and Mckinlay, Roline D. Pearson /Prentice Hall, 2nd edition, Delhi, 2008, ISBN: 9788177589030
2. 8051 Microcontroller Architecture, Programming and Application Ayala, Kenneth EEE/Prentice Hall of India, 2nd edition, New Delhi, 1 July 2004, ISBN: 9781401861582
3. Microcontroller Principle and Application Pal, Ajit Prentice Hall of India, New Delhi, 2014, ISBN: 9788120343924
4. Microcontroller Theory and Application Deshmukh, Ajay McGraw Hill Education, New Delhi, 2011, ISBN: 9780070585959
5. Microcontroller Architecture Programming, Interfacing and System Design Rajkamal Pearson Education India, Delhi, 2012, ISBN: 9788131759905
6. The Embedded Software Primer David E. Simon Addison-Wesley ISBN: 9780201615692

HW603-T	Routers and Switches
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Unit 1:

Introduction to Scaling Networks: Implementing a Network Design, Hierarchical Network Design, Identify Scalability Terminology, Selecting Network Devices, Selecting Switch Hardware, Selecting Router Hardware, Managing Devices, Basic Router Configuration Review, Basic Router Verification Review, Basic Switch Configuration Review, Basic Switch Verification Review. LAN Redundancy: Spanning-Tree Concepts, Draw a Redundant Topology, Purpose of Spanning Tree, Spanning-Tree Operation, Switch Models, Ports, Dual-Purpose Gigabit Ethernet Ports, Supported SFPs, LEDs, Router Compact Flash Memory Cards, Installation, Connecting to the Network, Removing the Switch Module, Express Setup, Managing the Switch Module, A Cable and Connectors

Unit 2:

Wireless LANs: Wireless LAN Concepts, Identify Wireless Technologies , WLANs Components and Topologies, Wireless LAN Operations, Label the 802.11 Frame, Wireless Media Contention, Associating with an AP, Channel Management Concepts , Wireless LAN Security WLAN Security Terminology, Identify the WLAN Security Characteristics, Wireless LAN Configuration, Configuring WLAN Routers and Clients, Troubleshooting WLAN Issues. Adjust and Troubleshoot Single-Area

Unit 3:

EIGRP: Characteristics of EIGRP, Describe Basic EIGRP Features, Identify and Describe EIGRP Packet Types, Identify Elements of the EIGRP Message Formats, Configuring EIGRP for IPv4, Configuring EIGRP with IPv4, Verifying EIGRP with IPv4, Operation of EIGRP, EIGRP Metric Concepts, DUAL Concepts Exercise, DUAL FSM Completion Exercise, Configuring EIGRP for IPv6, Comparing EIGRP for IPv4 and EIGRP for IPv6, Configuring and Verifying EIGRP for IPv6.

References:

1. CCNA Routing and Switching Practice and Study Guide: Exercises, Activities, and Scenarios to Prepare for the ICND2 (200-101) Certification Exam, Allan Johnson, Cisco Press, 2014
2. Cisco Connected Grid Ethernet Switch Module Interface Card Getting Started Guide, Cisco Systems, Inc. : January 2014
3. Cisco CCNA Routing and Switching 200-120 Flash Cards and Exam Practice Pack, Cisco Press, Eric Rivard, 2014

HW604-T

Virtualization and Cloud Computing

Unit I Introduction:

Introduction, Roots of Cloud Computing: From mainframe to Cloud, Benefits of Cloud Computing SOA, Web services, Web 2.0, Mashups, Grid computing, Utility computing, Hardware virtualization, Essentials of Cloud characteristics, Challenges, Cloud economics, Role of Networks in Cloud Computing: Cloud types and service models, Cloud computing platforms : Openstack, Opennimbis, Eucalyptus Primary Cloud Service models, Cloud Services brokerage, Primary cloud deployment models, cloud computing reference model, The Greenfield and Brownfield deployment options

Unit II Virtualization

Introduction, Characteristics of Virtualized environments, Taxonomy of Virtualization techniques, Pros and Cons of Virtualization, Technology examples: Xen, KVM, VMware, Microsoft Hyper-V

Unit III Storage in Cloud

Storage system architecture, Big data, Virtualized data centre (VDC) architecture, VDC Environment, server, storage, networking, desktop and application virtualization techniques and benefits, Virtual Machine Components and Process of converting physical to VMs, Block and file level storage virtualization, Virtual Provisioning, and automated storage tiering, VLAN, VSAN and benefits, Network traffic management techniques in VDC, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo. Features and comparisons among GFS,HDFS.

Books:

1. Cloud Computing by M N Rao, PHI Publication, 1st edition.
2. Cloud Computing by Saurabh Kumar, Wiley Publication
3. Cloud Computing Bible, Wiley Publication
4. Mastering Cloud Computing by R Buyya, C. Vecchiola and S. T. Selvi, TMH Publication
5. Cloud Computing: Concepts, Technology & Architecture by Thomas Erl, The Prentice Hall Service Technology Series
6. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012

HW605-T

Fundamentals of IPv6

Unit 1: Introduction to IPv6

IPv6, Why Transition to IPv6?, IPv4 Address Depletion, Access to IPv6-Only Customers, Better Performance, Securing Your Current Network, IPv4, IPv4 Address Depletion, CIDR, NAT with Private Addresses, Problems with NAT, NAT is Not Security, NAT Example, What About IPv5?, The Fascinating History of IPv6, Some Background, IPv4 Address Exhaustion and the Need for More International, A Call for Proposals, A More IP Version of IPv6, IPv6: More Than Just Longer Addresses, IPv6 Myths, Transitioning to IPv6, Comparing IPv4 and IPv6, IPv6 Address Representation and Address Types, Stateful DHCPv6

Unit 2: Routing IPv6

Hexadecimal Number System, IPv6 Address Types, Global Unicast Address (GUA), Link-Local Unicast Address, Unspecified Address, Solicited-Node Multicast Address, Address Terminology, ICMPv6 Neighbor Discovery Protocol (NDP), Neighbor Solicitation (NS) and Neighbor Advertisement (NA) Messages, Router Solicitation (RS) and Router Advertisement (RA) Messages, Dynamic Address Allocation. Configuring a Router as an IPv6 Router, Understanding the IPv6 Routing Table, Codes: NDp and ND, Code: Connected, Code: Local, Configuring IPv6 Static Routes, Static Routes with a GUA Next-Hop Address, Static Routes with a Link-Local Next-Hop Address, Static Routes with Only an Exit Interface, Default Static Routes with Link-Local Next-Hop Addresses
Verifying IPv6 Static Routes,

Unit 3: Implementing IPv6

Deploying IPv6 in the Network: IPv6 Address Plan Considerations, Encoding Information in the Subnet ID, VLAN-Mapped Subnet ID, IPv6 Address Plans, IPv6 VLANs, IPv6 First Hop Redundancy Protocols, ICMPv6 Neighbor Discovery, HSRP and VRRP, GLBP, Selecting an FHRP, Dual Stack, IPv6 Address Format in URL Syntax, DNS, DNS Query and Response, Happy Eyeballs, IPv6 Access Control Lists, Configuring IPv6 ACLs, Transition Technologies, Translation with NAT64, Traffic Initiated from IPv6-Only Clients to IPv4-Only Servers, Traffic Initiated from IPv4-Only Clients to IPv6-Only Servers, Other Translation Techniques, Tunneling IPv6

Text Books/References:

1. IPv6 Fundamentals: A Straightforward Approach to Understanding IPv6, Second Edition, Rick Graziani, Cisco Systems, Inc., 2017
2. Deploying IPv6 Networks, By Ciprian Popoviciu Eric Levy-Abegnoli Patrick Grossetete, Cisco Press, 2006

HW606-T

Red Hat System Administration-II

Unit 1: Servers

Web Servers: The Apache HTTP Server, Mail Servers, Email Protocols, Email Program Classifications, Mail Transport Agents, Mail Delivery Agents, Mail User Agents, Directory Servers, OpenLDAP, File and Print Servers: Samba, FTP, Print Settings, Configuring NTP Using the chrony Suite: Introduction to the chrony Suite, Understanding chrony and Its Configuration, Using chrony, Setting Up chrony for Different Environments, Using chronyc, Chrony with HW timestamping

Unit 2: Configuring NTP Using ntpd

Introduction to NTP, NTP Strata, Understanding NTP, Understanding the Drift File, UTC, Timezones, and DST, Authentication Options for NTP, Managing the Time on Virtual Machines, Understanding Leap Seconds, Understanding the ntpd Configuration File, Understanding the ntpd Sysconfig File, Disabling chrony, Checking if the NTP Daemon is Installed, Installing the NTP Daemon (ntpd), Checking the Status of NTP, Configure the Firewall to Allow Incoming NTP Packets

Configure ntpdate Servers, Configure NTP, Configuring the Hardware Clock Update, Configuring Clock Sources,

Unit 3: Configuring PTP Using ptp4l:

Introduction to PTP, Using PTP, Specifying and Configuring File, Using PTP Management client, Synchronizing the Clocks, Verifying Time Synchronization, Serving PTP Time with NTP, 0Serving NTP Time with PTP, Synchronize to PTP or NTP Time Using timemaster, Improving Accuracy

Text Books/References:

Red Hat Enterprise Linux 7 System Administrator' s Guide, Deployment , Configuration, and Administration of Red Hat Enterprise Linux 7 By Jaromír Hradílek, Douglas Silas, Stephen Wadeley, et.al., 2015

HW607-P	Practical Based on HW601-T Any 10 practical's based on Syllabus
HW608-P	Practical Based on HW602-T Any 10 practical's based on Syllabus
HW609-P	Major Project
HW610-P	Seminar Student should study and present latest technology