

Secondary School Curriculum Computer Engineering

Grade 11 and 12



Government of Nepal
Ministry of Education

Curriculum Development Centre

Sanothimi, Bhaktapur
Nepal

COMPUTER HARDWARE AND ARCHITECTURE GRADE-XI

Full Marks: 100 (50T + 50P)

Pass Marks: 18T + 25P

Periods per week: 3T + 3P

Teaching Hours: 150 [Theory (T)
75 + Practical (P) 75]

I. Introduction:

The goal of the course is to help students gain knowledge in computer hardware and architecture and build skills to troubleshoot computer hardware. This course is an introduction to basic computer architecture and discusses the basic structure of a digital computer and deals with the study of the Memory unit, Processor, Storage Devices and the I/O unit. This course develops the comprehensive knowledge of overall computer hardware, mobile computing, its components and the working principle of each component. This course also provides the skill to assemble, configure, operate, troubleshoot, repair as well as perform the maintenance of computers.

II. Objectives:

After the completion of this course, the students should be able to: -

- provide the concept of computer architecture.
- study the hierarchical memory system.
- study the processor architecture, concept of storage devices, I/O devices and standard I/O interfaces.
- configure Operating System, Network and applications in mobile computing.
- identify the parts of computer hardware and assemble the computer
- install the operating system, application programs, configuration of drivers
- learn to do the regular maintenance and repair of faulty parts

III. Course Contents Theory

Specific Objectives	Contents	Contact Hours
<ul style="list-style-type: none">• Explain history, generation and importance of computers in 21st century• Illustrate Von Neumann Architecture• Elaborate basic hardware components of computer (Power supply, casing, motherboards, CPU, Chipset, real-time clock, BIOS, Parallel ports, serial parts and interfacing)	Unit 1: Introduction to Computers 1.1 Basic introduction of computers 1.2 History of computers and its generation. 1.3 Importance of computers in 21st century. 1.4 Computer Organization (Block Diagram of Von Neumann Architecture) 1.5 Introduction of basic hardware components 1.6 Power supply, casing, motherboards, CPU, Chipset, real-time clock, BIOS 1.7 Parallel ports, serial parts, interfacing (IDE, SATA, PATA, ATAPC)	8
<ul style="list-style-type: none">• Elaborate different primary memories and	Unit 2: Memory 2.1 Characteristics of Memory System 2.2 Primary Memory (RAM, ROM, Cache,	12

<p>memory measurement unit.</p> <ul style="list-style-type: none"> • Illustrate and explain the memory addresses • Discuss Error-Correcting Codes • Explain SIMM, DIMM and RIMM memory modules 	<p>Virtual)</p> <p>2.3 Memory Measurement Unit</p> <p>2.4 Memory Addresses</p> <p>2.5 Error-Correcting Codes</p> <p>2.6 Memory Packaging and Types (SIMM, DIMM, RIMM)</p>	
<ul style="list-style-type: none"> • Explain hardwired implementation, micro-instruction sequencing and execution as well as application of micro-programming. • Elaborate Arithmetic and Logic unit; register types, bus architecture, instruction sets and executions. • Illustrate and explain different addressing modes with suitable examples. 	<p>Unit 3: Processor</p> <p>3.1 Hardwired and Micro programmed</p> <p>3.2 Arithmetic Logic Unit</p> <p>3.3 Types of Registers</p> <p>3.4 Bus Architecture</p> <p>3.5 Instruction Execution</p> <p>3.6 Addressing Modes (Immediate Addressing, Direct Addressing, Register Addressing, Register Indirect Addressing, Indexed Addressing and Based-Indexed Addressing)</p>	10
<ul style="list-style-type: none"> • Discuss memory hierarchies and magnetic disks. • Elaborate Raid • Explain DVD-R/W and flash drives 	<p>Unit 4: Storage Devices</p> <p>4.1 Memory Hierarchies</p> <p>4.2 Magnetic Disks (Track, Sector, Cluster, SATA, PATA)</p> <p>4.3 RAID (RAID 1, 3 and 5)</p> <p>4.4 DVD-R/W</p> <p>4.5 Flash Drive</p>	10
<ul style="list-style-type: none"> • Explain the external devices and I/O Interfaces • Elaborate I/O Technique and processor. 	<p>Unit 5: Input/Output Organization</p> <p>5.1 Peripheral devices</p> <p>5.2 Basic I/O Interfaces</p> <p>5.3 I/O Technique</p> <p>5.4 I/O Processor</p> <p>5.5 I/O Ports (Serial, Parallel, HDMI, VGA, USB 2.0 and 3.0)</p>	6
<ul style="list-style-type: none"> • Explain and elaborate the concept of mobile computing; it's architecture, applications and operating software. • Discuss the latest trends in mobile computing. 	<p>Unit 6: Mobile Computing</p> <p>6.1 Concept of Mobile Computing</p> <p>6.2 Architecture of Mobile Computing (Processor, Memory, Touch Screen, Network)</p> <p>6.3 Mobile Applications and Operating Software</p> <p>6.4 Latest Trends in Mobile Computing</p>	12
<ul style="list-style-type: none"> • Identify different components of a computer. • Discuss form factor, chipset, controller, buses 	<p>Unit 7: Computer Assembly</p> <p>7.1 Identify different components of a computer (Mother Board, Power Supply, Processor, Memory, Input/Output Devices, Printers and Ports)</p> <p>7.2 Mother Board (Form factor, Parts, Chipset and</p>	5

and bios. • Explain the concept of SMPS.	controller, Buses and BIOS) 7.3 Power Supply (SMPS Concept)	
• Troubleshoot different parts of a computer (motherboard, power supply and input devices) • Install, repair and upgrade Operating System. • Troubleshoot other hardware problems. • Set up a small network using network devices and cabling. • Troubleshoot display problems. • Install antivirus software and demonstrate virus scanning. • Learn and show how to backup data for disaster recovery.	Unit 8: Troubleshoot and Repair Maintenance 8.1 Mother Board (Form factor, Parts, Chipset and controller, Buses and BIOS) 8.2 Power Supply (SMPS Concept, UPS) 8.3 Input Devices (Keyboard, Mouse, Light Pen, Scanner, Optical Character Recognition (OCR)) 8.4 Installing, Repairing and Upgrading Operating System 8.5 PC Maintenance and Troubleshooting Strategies 8.6 Maintaining and Optimizing Operating System Performance 8.7 Troubleshooting Operating System and Applications Startup Problems 8.8 Troubleshooting Hardware Problems 8.9 Connecting to and Setting up a Network using Operating System 8.10 Operating System Resources on a Network and Security Strategies 8.11 Supporting Printers 8.12 Video Display Problems (Video Modes, Resolution, Color, Size) 8.13 Virus Detection and Protection (Background of viruses, Virus scanning and Antivirus software) 8.14 Disaster Recovery (Risk of data, Backup methods devices and media, Backup scheduling, Recovery of data)	12

IV. Course Contents Practical

Practicals	Contact Hours
1) Demonstration of basic computer hardware components	2
2) a) Demonstration of computer primary memory b) Demonstration and Identification SIMM, DIMM and RIMM memory modules	2
3) a) Identification of computer processor in a motherboard b) Demonstrate the working procedure of processor using simulator	2
4) Demonstration of different storage devices	2
5) a) Demonstration of different input/output devices b) Demonstration of different types of ports	4
6) a) Mobile repair and maintenance b) Troubleshooting mobile operating system c) Network configuration in mobiles d) Mobile apps and mobile memory management	15
7) a) Physical Installation Procedure b) Memory Module Physical Installation Procedure	15

c) Motherboard Physical Installation Procedure d) Identification Procedures e) Video Card Identification Procedure f) Operation System Identification Procedure g) File System Identification Procedure	
8) a) I/O Port Physical Installation Procedures b) System Case Preparation Procedure c) Hard Disk Drive Physical Installation Procedure d) CD-ROM Drive Physical Installation Procedure e) Processor Physical Installation Procedure f) Heat Connector Physical Installation Procedure g) PS/2 Mouse Port Connector Physical Installation Procedure h) Video Card Physical Installation Procedure i) Uninstallation and Disassembly Procedures j) System Case Cover Removal Procedure k) Setup and Inspection Procedures l) Post-Assembly Inspection Procedure m) Post-Assembly Initial Boot Procedure n) Safe BIOS Setup Procedure o) Post-Assembly Initial Test Procedure p) Hard Disk Partitioning and Formatting Procedure q) CD-ROM Driver Installation Procedure	25
9) PROJECT Computer assembly and software installation project. Perform total assembly of all hardware components. Install OS, antivirus and word processing software in the assembled computer	8

V. Instructional Materials:

- To be guided by Teaching Manual

VI. Instructional Techniques:

- To be guided by Teaching Manual

VII. Marks and hours distribution

Groups	Unit	Marks Distribution	Number of Hours
		Theory	Theory
Group A	1	6	8
	7	3	5
Group B	2	8	12
	3	7	10
Group C	4	7	10
	5	3	6
Group D	6	8	12
Group E	8	8	12
	Total	50	75

VIII. Evaluation Schemes

a) Theory Evaluation:

S. No.	Topics	No. of Questions	Marks	Total
1	Very Short Questions	5	2	10

2	Short Questions	5	6	30
3	Long Question (Analytical)	1	10	10
	Total			50

b) Practical Evaluation:

Internal Evaluation Marks	External Evaluation Marks
30	20

Lab Exercises are guided by marks distribution and Teaching Manual.

Practical Internal Examination Evaluation Scheme (30 Marks)

Internal evaluation will be conducted by course teacher based on following activities:

1) Attendance and Class Performance	5 Marks
2) Lab/Field/Case Study Report	5 Marks
3) Practical First Exam	10 Marks
4) Practical Second Exam	10 Marks
Total	30 Marks

Practical External Examination Evaluation Scheme (20 Marks)

1) Practical Exam	15 Marks
2) Viva voce	5 Marks
Total	20 Marks

IX. Reference Books:

- W. Stalling, Computer Organization and Architecture 17 edition, Prentice-Hall India Limited, New Delhi.
- Winn L. Rosch, The hardware Bible 3rd Edition
- Scott Mueller, Upgrading and Repairing PCs.

Full Marks: 50
Pass Marks: 18
Time: 1.5 Hrs.

**HSEB
Computer Science-Grade XI
Model Questions**

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

**Group – A
(Very Short Answer Questions)**

Five Questions [2x5=10]

Group – B
(Short Answer Questions)

Six Questions [5x6=30]

Group – C
(Long Answer Question)

One Question [1x10=10]

COMPUTER PROGRAMMING GRADE-XI

Full Marks: 100 (50T + 50P)

Pass Marks: 18T + 25P

Periods per week: 3T + 3P

Teaching Hours: 150 [Theory (T)
75 + Practical (P) 75]

I. Introduction:

The goal of the course is to gain knowledge in the basic concepts of object-oriented programming and build skills to develop modern software programs. It provides you with the basic skills required to develop functionally sound Visual Basic Dot NET applications. Another course offers an introduction to the Java programming language for those students who have had little or no background in programming to develop the platform independent programming.

II. Objectives:

After the completion of this course, the students should be able to: -

- have gained a good understanding of the basic concepts of object orientation concept
- have a good understanding of the Visual Basic language structure and language syntax
- have developed the ability to design and develop interactive applications using the object-oriented principals, encapsulation, inheritance and to some extents polymorphism
- be able to effectively develop applications with full functionality and a graphical user interface using the language Visual Basic
- Use Java language with program structure in general, and Java syntax, data types, flow of control, classes, methods, objects, arrays, exception handling, recursion, and graphical user interfaces (GUIs).
- Create Java technology applications that leverage the object-oriented features of the Java language, such as encapsulation, inheritance, and polymorphism

III. Course Contents Theory

Specific Objectives	Contents	Contacts Hours
<ul style="list-style-type: none">• Explain the different types of programming languages• Develop Algorithm, Flowchart and Pseudocode with examples• Comparison between different programming languages	Unit 1: Review of Programming Concept 1.8 Definition 1.9 Concept of Programming Language 1.10 Flowchart 1.11 Algorithm 1.12 Pseudocode 1.13 New Paradigm of Programming Language 1.14 Difference between Object Oriented and Event Driven Programming	5
<ul style="list-style-type: none">• Define Object Oriented Programming Concept• Explain Java Programming	Unit 2: Object Oriented Programming (OOPs) Concept with Java 2.7 Definition, Features and Characteristics of	15

<p>Language Tools and Features</p> <ul style="list-style-type: none"> Develop an example program featuring Control Statements 	<p>OOPs</p> <p>2.8 Importance of OOPs</p> <p>2.9 Basic Concept of Java Programming</p> <p>2.10 Introduction to Java Technologies (J2SE, J2EE, J2ME)</p> <p>2.11 Java Tools (javac, java, appletviewer, javadoc, jar, JVM, JRE, JDBC, JDK)</p> <p>2.12 Variables, Tokens and Data Types</p> <p>2.13 Operators</p> <p>2.14 Conditional Statements (if, if else, if else, switch)</p> <p>2.15 Concept of Loops (while, do-while and for)</p>	
<ul style="list-style-type: none"> Construct a program using Class, Objects, Constructor and Methods Apply the concept of inheritance and methods overriding in a program 	<p>Unit 3: Classes and Objects</p> <p>3.7 Concept of Class</p> <p>3.8 Declaring Objects</p> <p>3.9 Methods</p> <p>3.10 Constructor</p> <p>3.11 Inheritance</p> <p>3.12 Methods Overriding</p>	8
<ul style="list-style-type: none"> Implement the package and interface in Java Programs 	<p>Unit 4: Package and Interface</p> <p>4.6 Concept of Package</p> <p>4.7 Create and Import Package</p> <p>4.8 Sub Package</p> <p>4.9 Concept of Interface</p> <p>4.10 Implement and Apply Interface</p>	5
<ul style="list-style-type: none"> Develop a program to read and write using I/O stream Implement and execute Java Applet in Web Browser 	<p>Unit 5: I/O and Java Applets</p> <p>5.6 I/O Stream</p> <p>5.7 Read and Write Console</p> <p>5.8 Concept of Applets</p> <p>5.9 Embedding Applet to HTML File</p>	6
<ul style="list-style-type: none"> Define .NET Framework and its properties Illustrate the Integrated Development Environment and its properties using Visual Programming Compare Methods and Events in Visual Programming 	<p>Unit 6: Visual Programming</p> <p>6.5 Concept of .NET Framework</p> <p>6.6 Common Language Runtime (CLR)</p> <p>6.7 Intermediate Language</p> <p>6.8 Assemblies, Class Libraries and Namespace</p> <p>6.9 Introduction to Visual Studio</p> <p>6.10 Integrated Development Environment (Menu bar, Toolbar, Explorer, Toolbox properties, Form Designer)</p> <p>6.11 Methods and Events in Visual Programming</p>	6
<ul style="list-style-type: none"> Develop an example program featuring Conditional and Looping Statements Compare Sub and Functions Apply Build in Functions in Visual Program 	<p>Unit 7: Visual Language</p> <p>7.4 Variables and Data Types</p> <p>7.5 Constants</p> <p>7.6 Array</p> <p>7.7 Control Statement (Conditional and Loop Statement)</p>	8

	7.8 Sub and Functions (Passing variables and arguments, Returning value from the function) 7.9 MsgBox and InputBox	
<ul style="list-style-type: none"> Develop a user friendly Form using different Toolbox Design an interactive menu using Menus and Toolbars 	Unit 8: Working with Forms 8.15 Concept of Form 8.16 Toolbox (TextBox, Label, Button, ListBox, ComboBox, CheckBox, PictureBox, RadioButton, ScrollBar, Timer, ListView, Toolbar and Statusbar) 8.17 DialogBox (OpenFileDialog, SaveFileDialog, FontDialog, ColorDialog, PrintDialog) 8.18 Menu Design (Context Menu, Access and Shortcut Key)	6
<ul style="list-style-type: none"> Construct a program using Class, Objects, Methods, Events and its properties Show Window Components and API from build in Components Create Dynamic Link Library Apply Error Handling in a program 	Unit 9: Object Oriented Programming 9.1 Class and Object 9.2 Properties, Methods and Events 9.3 Constructors 9.4 Concept of Inheritance 9.5 User Control and COM Technology 9.6 Accessing the WIN32 API from .NET and Interfacing 9.7 Dynamic Link Library (DLL) 9.8 Exception Handling (Try, Catch)	6
<ul style="list-style-type: none"> Define Data Connection Concept using ADO .NET Develop Database connecting program using ADAPTER, COMMAND and READER 	Unit 10: Database in Visual Programming 10.1 Concept of ADO .NET 10.2 Database Connection (ODBC, OLE DB, SQL Client) 10.3 Data Adapter and Command 10.4 Data Reader 10.5 Report Generation	10

IV. Course Contents Practical

Practical's	Contact Hours
Unit 1: Develop a flowchart, algorithm and Pseudocode with the concept of sequence iteration, loops	3
Unit 2: <ul style="list-style-type: none"> Installation of Java Tools. Console program to demonstrate conditional and looping statements. 	7
Unit 3: <ul style="list-style-type: none"> Demonstrate class, object, methods, constructor, and Inheritance, Console program to demonstrate Class, Objects, Constructor and Methods. Console program to apply the concept of inheritance and methods overriding. 	8
Unit 4: <ul style="list-style-type: none"> Create and import Java Package and Sub-Package. 	5

• Console Program to implement and apply interface.	
Unit 5: • Create I/O Stream program. • Embed a Java Applet Program to a HTML File.	5
Unit 6: • Install VB.NET Program.	2
Unit 7: • Console Program to declare variables and data types • Console Program to demonstrate conditional and looping statements. • Console program to demonstrate Sub and Functions. • Use MsgBox and InputBox with properties	5
Unit 8: • Design Form and develop a simple calculator. • Use Toolbox with properties • Create DialogBoxes • Create MDI Menu	10
Unit 9: • Create Class, Objects, Constructor and Methods. • Use build-in and user defined Component in Form. • Develop and use DLL. • Develop a program to handle the exception	6
Unit 10: • Develop Database Connection Program with Insert, Update, Delete and Search Options. • Generate the Report using Crystal Report.	12
PROJECT Database integrated Project	12

V. Instructional Materials:

- To be guided by Teaching Manual

VI. Instructional Techniques:

- To be guided by Teaching Manual

VII. Marks and hours distribution

Groups	Unit	Marks Distribution	Number of Hours
		Theory	Theory
Group A	1	3	5
	2	6	15
Group B	3	4	8
	4	6	5
	5	4	6
Group C	6	5	6
	7	5	8
Group D	8	4	6
	9	5	6
Group E	10	8	10
	Total	50	75

VIII. Evaluation Schemes

c) Theory Evaluation:

S. No.	Topics	No. of Questions	Marks	Total
1	Very Short Questions	5	2	10
2	Short Questions	5	6	30
3	Long Question (Analytical)	1	10	10
	Total			50

d) Practical Evaluation:

Internal Evaluation Marks	External Evaluation Marks
30	20

Lab Exercises are guided by marks distribution and Teaching Manual.

Practical Internal Examination Evaluation Scheme (30 Marks)

Internal evaluation will be conducted by course teacher based on following activities:

5) Attendance and Class Performance	5 Marks
6) Lab/Field/Case Study Report	5 Marks
7) Practical First Exam	10 Marks
8) Practical Second Exam	10 Marks
Total	30 Marks

Practical External Examination Evaluation Scheme (20 Marks)

3) Practical Exam	15 Marks
4) Viva voce	5 Marks
Total	20 Marks

IX. Reference Books:

- Holzner Steven (2002), *VB.Net Programming Black Book*, New Delhi, Dream Tech Publication
- Petroutsos Evangelos (2002), *Mastering VB.NET*, New Delhi, BPB Publications.
- E. Balaguruswamy(2010), *Programming in JAVA*, New Delhi, TMH Publication
- Deitel Harvey M. , Deitel Paul J.(2009) , *Java How to Program*, 8th Edition, New Delhi, Prentice Hall

Full Marks: 50
Pass Marks: 18
Time: 1.5 Hrs.

HSEB
Computer Science-Grade XI
Model Questions

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group – A
(Very Short Answer Questions)

Five Questions [2x5=10]

Group – B
(Short Answer Questions)

Six Questions [5x6=30]

Group – C
(Long Answer Question)

One Question [1x10=10]

DATA COMMUNICATION AND COMPUTER NETWORK GRADE-XII

Full Marks: 100 (50T + 50P)

Pass Marks: 18T + 25P

Periods per week: 3T + 3P

Teaching Hours: 150 [Theory (T)
75 + Practical (P) 75]

I. Introduction:

The goal of the course is to help students gain knowledge in the basic concepts of communication system and computer network and build skills to design, develop and troubleshoot of basic network system. The communication system consists of introduction to different types of transmission system and media, concepts of multiplexing and switching techniques and introduction of AM and FM modulation schemes. The course in networking lays out the principles of basics of networking, understanding of network topologies, network architecture and reference models.

II. Objectives:

After the completion of this course, the students should be able to: -

- provide students with knowledge of principles of transmission, multiplexing, switching, modulation, signaling and networking aspects of modern telecommunication systems,
- develop meaningful understanding of different kinds of networking topologies and their structure and design,
- explain telephone system, electronic email, data flows, networking protocols, and organization around ISO-OSI seven-layer architecture, with review of each layer.
- To develop the skill of network and basic communication troubleshooting.

III. Course Contents Theory

Specific Objectives	Contents	Contact Hours
<ul style="list-style-type: none">• Understand basic of analog and digital communication system.• Understand different types of transmission media.• Explain Simplex, Half-Duplex and Full-Duplex with suitable examples.	Unit 1: Communication System and Transmission Media 1.15 Introduction to Analog and Digital Communication System (Block Diagram) 1.16 Transmission media (twisted pair, coaxial cable, optical fiber, radio and microwave) 1.17 Simplex, Half-Duplex and Full-Duplex	6
<ul style="list-style-type: none">• Understand different multiplexing techniques.• Elaborate different types of switching and techniques.	Unit 2: Multiplexing and Switching 2.16 Time-division multiplexing (TDM) 2.17 Frequency division multiplexing (FDM) 2.18 Space-division multiplexing (SDM) 2.19 Wavelength-division multiplexing (WDM) 2.20 Message switching 2.21 Packet switching 2.22 Circuit switching 2.23 Telephone switching	7

<ul style="list-style-type: none"> Illustrate AM and FM modulation schemes with suitable circuit diagrams. 	Unit 3: Modulation Scheme 3.13 Amplitude Modulation (AM) (Circuit Diagram) 3.14 Frequency Modulation (FM) (Circuit Diagram)	10
<ul style="list-style-type: none"> Understand different types of network architecture and their applications. Understand different types of network topologies and their applications. 	Unit 4: Computer Network and Topology 4.11 Concept of Computer Network 4.12 Definition, use and prospect of LAN 4.13 Types of networking: LAN, MAN, WAN 4.14 Star, Bus, Ring and Mesh Topology	8
<ul style="list-style-type: none"> Explain OSI and TCP/IP reference model. Compare OSI and TCP/IP Model. 	Unit 5: Reference Model 5.10 OSI Reference Model 5.11 TCP/IP Reference Model 5.12 Comparison between OSI and TCP/IP Model	10
<ul style="list-style-type: none"> Understand the IPV4 Internet protocol and their addressing schemes. Introduce the basics of IPV6 	Unit 6: IP Addressing 6.12 IPV4 Frame Format 6.13 IP Addresses and Classes 6.14 Subnet and Subnet mask 6.15 Introduction to IPV6	7
<ul style="list-style-type: none"> Understand the basics of Routing. Make use of Cisco Simulator. 	Unit 7: Router Configuration 7.10 Introduction to Routing 7.11 Introduction to Cisco Simulator	5
<ul style="list-style-type: none"> Justify the physical layer in the networking system. 	Unit 8: Network Cabling 8.19 Twisted Pair Cable 8.20 Co-axial Cable 8.21 Base-band Cable 8.22 Broad-band Cable 8.23 Fiber Optics 8.24 Wireless Networking 8.25 Physical Layer Devices (Hub, Repeaters) software) 8.26 Disaster Recovery (Risk of data, Backup methods devices and media, Backup scheduling, Recovery of data)	10
<ul style="list-style-type: none"> Make use of cables and implement a simple network system. 	Unit 9: Network Troubleshoot 9.1 Twisted Pair Cable 9.2 Co-axial Cable 9.3 Base-band Cable 9.4 Broad-band Cable 9.5 Fiber Optics 9.6 Wireless Networking 9.7 Physical Layer Devices (Hub, Repeaters)	12

IV. Course Contents Practical

Practicals	Contact Hours
1) Demonstrate AM and FM modulation and demodulation schemes using trainer kit.	10

2) Installation of network interface card and network devices like hub and switch.	10
3) Cabling: construction of straight-through and cross-over cable and verify the physical layer connectivity	10
4) Installation and configuration of workstation PC	8
5) Setup peer-to-peer networking and verify it	10
6) Install and configure server for client server networking; also verify it	10
7) Familiarization with basic network commands: Observing IP address and MAC address, Setting IP address and default gateway in PC, Verifying network layer connectivity	10
8) Understanding Route interface and Basic Router using Routing simulator.	7

V. Instructional Materials:

- To be guided by Teaching Manual

VI. Instructional Techniques:

- To be guided by Teaching Manual

VII. Marks and hours distribution

Groups	Unit	Marks Distribution	Number of Hours
		Theory	Theory
Group A	1	4	6
	2	4	7
Group B	3	7	10
Group C	4	5	8
	5	7	10
Group D	6	5	7
	7	3	5
Group E	8	7	10
	9	8	12
	Total	50	75

VIII. Evaluation Schemes

e) Theory Evaluation:

S. No.	Topics	No. of Questions	Marks	Total
1	Very Short Questions	5	2	10
2	Short Questions	5	6	30
3	Long Question (Analytical)	1	10	10
	Total			50

f) Practical Evaluation:

Internal Evaluation Marks	External Evaluation Marks
30	20

Lab Exercises are guided by marks distribution and Teaching Manual.

Practical Internal Examination Evaluation Scheme (30 Marks)

Internal evaluation will be conducted by course teacher based on following activities:

9) Attendance and Class Performance	5 Marks
10) Lab/Field/Case Study Report	5 Marks
11) Practical First Exam	10 Marks
12) Practical Second Exam	10 Marks
<hr/>	
Total	30 Marks

Practical External Examination Evaluation Scheme (20 Marks)

5) Practical Exam	15 Marks
6) Viva voce	5 Marks
<hr/>	
Total	20 Marks

IX. Reference Books:

- Tanenbaum, A. S., & Wetherall, D. (2011). Computer networks (5th ed). Boston: Pearson Prentice Hall.
- Rosch, W. L. (2003). Winn L. Rosch hardware bible. [Indianapolis, IN]: Que Pub.
- Mueller, S. (2015). *Upgrading and repairing PCs*.

Full Marks: 50
Pass Marks: 18
Time: 1.5 Hrs.

HSEB
Computer Science-Grade XI
Model Questions

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group – A
(Very Short Answer Questions)

Five Questions [2x5=10]

Group – B
(Short Answer Questions)

Six Questions [5x6=30]

Group – C
(Long Answer Question)

One Question [1x10=10]

WEB DEVELOPMENT AND DATABASE GRADE-XII

Full Marks: 100 (50T + 50P)

Pass Marks: 18T + 25P

Periods per week: 3T + 3P

Teaching Hours: 150 [Theory (T)
75 + Practical (P) 75]

I. Introduction:

The goal of the course is to help students gain knowledge in the basic concepts of web development and build skills to develop web based application using the web tools, scripting and server side language. The goal of course is to provide application developers easy and complete understanding of MySQL and PHP which are most popular open source technologies to emerge during the past decade and technologies provide a powerful platform for building database-driven Web application.

II. Objectives:

After the completion of this course, the students should be able to: -

- To gain an understanding of the theories and concepts underlying web development
- To gain the skill of HTML structures and functionality.
- To develop the web based application with client side control mechanism
- To build skill to mapping of web design structure to coding using CSS
- To develop web application with integration database handling
- To gain the knowledge of database management system and apply to web applications.

III. Course Contents Theory

Specific Objectives	Contents	Contact Hours
<ul style="list-style-type: none">Describe the concept of Hyper text and Markup language conceptWorking with HTML basic tag for Text formatting, Listing, Hyper link, Image, Table, Form and Frame with properties and values	Unit 1: Introduction to HTML 1.18 Concept of WWW 1.19 Component of www and URL 1.20 HTML editors (Dreamweaver, Notepad ++, Edit Plus) 1.21 Basic HTML construct, building blocks 1.22 Working with Fonts and Formats 1.23 Working with Lists and Links 1.24 Working with Images 1.25 Working with Tables 1.26 Working with Forms and Frames	10
<ul style="list-style-type: none">Explain basic client-side scripting structureIntegrate JavaScript within HTML documentsBuild interactive site componentsApply existing	Unit 2: JavaScript 2.24 Java Script Overviews 2.25 Java Script and WWW 2.26 Java Script elements 2.27 Functions 2.28 Variables and Expressions 2.29 Statements; if, for, while	10

contemporary UI components	2.30 Array 2.31 Events handlers 2.32 Objects and Events 2.33 Getting data from Form 2.34 Concept of JQUERY	
<ul style="list-style-type: none"> Explore the different levels and abilities of style sheets. Apply the CSS for designing in HTML basic structure 	Unit 3: Cascading Style Sheet 3.15 Web page and CSS 3.16 CSS implementation 3.17 Basic Elements of CSS Design 3.18 CSS Building Blocks 3.19 Text properties 3.20 Colors, backgrounds and images 3.21 Lists 3.22 Links 3.23 Basic Design of layout 3.24 Types of layouts 3.25 CSS Responsive	10
<ul style="list-style-type: none"> Explain the basic concept of dynamic and statics WWW Differentiate client side and server side scripting language. Configure the web development tools 	Unit 4: Introduction to PHP, MYSQL and APACHE 4.15 Introduction of Static and Dynamic Website 4.16 Concept of Server Side Scripting Language and Web Server 4.17 Introduction of Apache, PHP, MySQL 4.18 Introduction to WAMP 4.19 Installing Apache, PHP, MySQL	4
<ul style="list-style-type: none"> Configure the web server properties and values. Configure the basic file of PHP scripting language. 	Unit 5: Configuration of Apache and PHP 5.13 Apache Version and installation 5.14 Apache configuration file structure 5.15 Apache Log file 5.16 Apache related commands 5.17 Troubleshooting in Apache Server 5.18 Installation and Configuration of PHP 5.19 php.ini basic 5.20 Basic PHP Scripts 5.21 Integrating PHP with HTML	6
<ul style="list-style-type: none"> Describe the basic structure of PHP scripting language Demonstrate the control structure, function, array and string use in programming 	Unit 6: Programming Structure of PHP 6.16 Data types, Variables, Operators and Expression 6.17 Flow Control in PHP: if statement, switch statement, ? operator, loops 6.18 Code block and Browser output 6.19 Working with functions : Define and Call Function 6.20 Returning Value from user define function 6.21 Scope of Variable 6.22 Setting Default Value for arguments, passing value reference to function 6.23 Create an Array	10

	6.24 Create an Object 6.25 Working with String, Date and Time 6.26 String Manipulation	
<ul style="list-style-type: none"> Design form for capture and retrieve the inform from client to server 	Unit 7: Working With Form 7.12 Creating a user Form 7.13 Hidden filed for save state 7.14 Redirecting user 7.15 Sending mail on form submission 7.16 Working with file uploading 7.17 Working with Session	5
<ul style="list-style-type: none"> Describe the concept of DBMS Explain the DDL, DML, DCL SQL statement to handling the database. Explain the database security and backup 	Unit 8: Database Management System 8.27 Review of Database Management Concept 8.28 Relational Database Management System 8.29 SQL Statement to DML, DDL, DCL 8.30 Database security and Back up	10
<ul style="list-style-type: none"> Demonstrate the database connectivity. Explain the AJAX concept Describe the Captcha 	Unit 9: MySQL and PHP 9.1 Connecting to MySQL with PHP 9.2 Working with MySQL Data 9.3 File Uploading & Emails 9.4 Making a Contact Us Form on a website 9.5 PHP and AJAX 9.6 Creating Images on the Fly 9.7 Image Captcha 9.8 Restrict Viewing on the website	10

IV. Course Contents Practical

Practical's	Contact Hours
Unit 1: <ul style="list-style-type: none"> Design Web page to describe web skeleton Demonstrate Text formatting Create list and insert image Create hyper link Create table with properties Create Form with properties Create Frame 	10
Unit 2: <ul style="list-style-type: none"> Demonstrate data types and variables Use build-in function to accept the information Demonstrate control structure Apply Array Demon different types of events handling Design and develop form to validation of data 	10

<ul style="list-style-type: none"> • Apply basic structure of JQUARY 	
Unit 3: <ul style="list-style-type: none"> • User CSS elements in inline CSS • User CSS elements in embedded CSS • User CSS elements in external CSS • Apply Text, Image, List, Table, Form properties • Design Layouts • Design CSS Responsive 	10
Unit 4: Install PHP and MySQL <ul style="list-style-type: none"> • Install Apache server 	3
Unit 5: <ul style="list-style-type: none"> • Configure the apache server • Configure the PHP file • Integrate the PHP and HTML 	6
Unit 6: <ul style="list-style-type: none"> • Apply the control structure of PHP • Create function and pass the values • Create array and objects • Implement the build in string function 	10
Unit 7: <ul style="list-style-type: none"> • Design form to capture different types of values • Design form to sent mail • Upload file • Create session 	5
Unit 8: <ul style="list-style-type: none"> • Create table and apply DDL and DML statement 	5
Unit 9: Create a database connection class Develop Database Connection Program with Insert, Update, Delete and Search Options. through PHP form Implement the AJAX Use the captcha	10
PROJECT Database integrated Web Application	5

V. Instructional Materials:

- To be guided by Teaching Manual

VI. Instructional Techniques:

- To be guided by Teaching Manual

VII. Marks and hours distribution

Groups	Unit	Marks Distribution	Number of Hours
		Theory	Theory
Group A	1	5	10
	2	7	10
Group B	3	6	10
	4	2	4
	5	2	6
Group C	6	8	10
	7	6	5
Group D	8	6	10
Group E	9	8	10
	Total	50	75

VIII. Evaluation Schemes

g) Theory Evaluation:

S. No.	Topics	No. of Questions	Marks	Total
1	Very Short Questions	5	2	10
2	Short Questions	5	6	30
3	Long Question (Analytical)	1	10	10
	Total			50

h) Practical Evaluation:

Internal Evaluation Marks	External Evaluation Marks
30	20

Lab Exercises are guided by marks distribution and Teaching Manual.

Practical Internal Examination Evaluation Scheme (30 Marks)

Internal evaluation will be conducted by course teacher based on following activities:

13) Attendance and Class Performance	5 Marks
14) Lab/Field/Case Study Report	5 Marks
15) Practical First Exam	10 Marks
16) Practical Second Exam	10 Marks
Total	30 Marks

Practical External Examination Evaluation Scheme (20 Marks)

7) Practical Exam	15 Marks
8) Viva voce	5 Marks
Total	20 Marks

IX. Reference Books:

Felke-Morris, T. (2013). Web development and design foundations with HTML5 (6th ed). New Delhi : Pearson.

MacCaw, A. (2011). Java Script web applications: Alex MacCaw. O'Reilly.

Meloni Julie C(2010)., *Teach Yourself PHP, MySQL and Apache*, New Delhi, Pearson Education Pvt. Ltd. Delhi

Holzner, Steven(2008), *PHP : the complete reference*, New Delhi ,Tata McGraw-Hill

Full Marks: 50
Pass Marks: 18
Time: 1.5 Hrs.

HSEB
Computer Science-Grade XI
Model Questions

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Group – A
(Very Short Answer Questions)

Five Questions [2x5=10]

Group – B
(Short Answer Questions)

Six Questions [5x6=30]

Group – C
(Long Answer Question)

One Question [1x10=10]