SEMESTER IV

Title of the course : **Object Oriented Programming**

Subject Code : **CS-221**

Weekly load : 6 Hrs LTP 2-0-4

Credit : 4 (Lecture 2, Practical 2)

**Course Outcomes:** At the end of the course, the student will be able to:

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| CO1 | Apply object-oriented approach to design the programs. |
| CO2 | Understand reusability of code using inheritance. |
| CO3 | Analyze polymorphic and virtual behaviour of functions. |
| CO4 | Use stream classes in file-handling. |

**Theory**

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| **Unit** | **Main Topics** | **Course outlines** | **Lecture(s)** |
| **Unit-1** | 1. Introduction | Object-oriented programming, characteristics of object-oriented languages, C++ Programming Basics:Basic program construction, Pre-processor directives, variables, Operators, Library functions, manipulators. | 04 |
| 2. Decision-making | Relational operators: loops; decisions; logical operators; other control Statements | 04 |
| 3. Structures and Functions | Structure enumerated data types; functions; passing arguments to functions and returning values from functions, unions. | 03 |
| 4. Classes and Objects | Creation, accessing class members, Private Vs Public, Constructor and Destructor Objects. | 03 |
| **Unit-2** | 5. Member Functions | Method definition, Inline functions implementation, Constant member functions Friend Functions and Friend Classes, Static functions Overloading Member Functions, Need of operator overloading, operator overloading | 05 |
| 6.Inheritance | Definition of inheritance, protected data, private data, public data, inheriting constructors and destructors, constructor for virtual base classes, constructors and destructors of derived classes, size of a derived class, order of invocation, types of inheritance, single inheritance, hierarchical inheritance, multiple inheritance, hybrid inheritance, multilevel inheritance. | 05 |
| 7. Polymorphism and Virtual Functions | Importance of virtual function, function call binding, implementing late binding, need for virtual functions, abstract base classes and pure virtual functions, virtual destructors | 04 |
| 8. File and Streams | File and Streams components of a file, different operation of the file, creation of file streams, stream classes, header files, updating of file, opening and closing a file. | 04 |

**Total=32**

**Recommended Books:**

1. SB Lippman and J Lajoie,C++ Primer, Addison Wesley ,New Delhi
2. KR Venugopal , Mastering C++ , TMH Publishing
3. E. Balaguruswamy, Object Oriented Programming in C++, TMH Publishing Co. Ltd,

New Delhi.

1. Robert Lafore, C++, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi.

Title of the course : **Object Oriented Programming Lab**

Subject Code : **CS-221**

**Course Outcomes:** At the end of the course, the student will be able to:

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| CO1 | Understand the basic concepts of writing a program in C++. |
| CO2 | Apply various object-oriented features like classes, inheritance and polymorphism to solve various computing problems using C++ language. |

**LIST OF PRACTICALS**

1. Write a program to display hello on the screen.
2. Write a program to display your Name, address and city in different lines.
3. Study different data types and their range.
4. Write a program to get the two numbers from user and find addition, subtraction, multiplication, division.
5. Write a program to find the area and volume of sphere. Formulas are Area=4\*PI\*R\*R\*R volume=4/3\*PI\*R\*R\*R.
6. Write a program to convert the degree to radian using the formula Radian=degree\*PI/180.
7. Write a program to convert the Fahrenheit into centigrade. Formula. c= (F-32)/1.8
8. Write a program to swap the values of two variables A, B. Without using other variable
9. Write a program to check whether given number is positive or negative.
10. Write a program to determine whether a number entered by the user is odd or even and print the message NUMBER IS EVEN or NUMBER IS ODD.
11. Study about functions. Write a program using add(), sub(), mul(), and div() for addition, subtraction, multiplication and division respectively.
12. Write a program to illustrate the use of various string functions.
13. Write about array. Write a program to create an array and find the sum of all the elements.
14. Write a program to create 2-dimensional array and print the list of its elements.
15. Write a program to add, subtract, multiply and division of two matrices.
16. To study control structures. Write a program to print numbers from 1 to 10 and also print the squares of these numbers in front of them.
17. Write a program to display the following pattern:   
      
                      1   
                  2     3   
              4      5     6   
          7      8      9     10
18. Write a program to find the 1-2+3-4+5+N.
19. Write a program to print day of week using switch case.
20. Write about polymorphism. Write a program to illustrate operator overloading.
21. Write about inheritance. Write a program for single inheritance.
22. Write a program using class to generate mark sheet using multiple inheritance.
23. Create a class MyArith having member functions add (), sub (), mul (), div () which performs the arithmetic operations.
24. Write a program to illustrate the use of constructors using classes.
25. Write a program to illustrate the use of friend function.

Title of the course : **Network Operating System**

Subject Code : **CS-222**

Weekly load : 4 Hrs LTP 2-0-2

Credit : 3 (Lecture 2, Practical 1)

**Course Outcomes:** At the end of the course, the student will be able to:

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| --- | --- |
| CO1 | Study the basics of Linux based Operating System. |
| CO2 | Learn the installation, configuring and setup of Linux Operating System. |
| CO3 | Develop the skill of shell programming in Linux. |
| CO4 | Access advanced configuration and system management features of Linux. |

**Theory**

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| **Unit** | **Main Topics** | **Course outlines** | **Lecture(s)** |
| **Unit-1** | 1. Introduction to Linux Operating System | History of Linux and Unix, Linux overview, Linux releases, Open Linux | 04 |
| 2. Installing Linux | Hardware, software and information requirements; opening disk space for Linux partitions; creating the open Linux install disks; installing Linux; | 04 |
| 3. Installing Drivers | Installing and configuring X-windows; installing sound drivers. | 02 |
| 4. Linux Startup and Setup | User accounts; accessing the Linux system; Linux commands; online manual; online documentation; installing software packages | 04 |
| **Unit-2** | 5. Shell | The command line: special characters and file arguments; standard input/ output and redirection; pipes; redirecting and piping with standard errors; shell scripts; jobs. | 06 |
|  | 6. Linux file Structure | Linux files; file structure; listing, displaying and printing files; managing directories; file and directory operations | 04 |
| 7. VI editor | vi editing commands; advanced vi editing commands; line editing commands; options in v i | 04 |
| 8. System Administration | System management, managing users; installing and managing devices | 04 |

**Total=32**

**Recommended Books:**

1. Linux the Complete Reference, Richard Peterson TMH, New Delhi.
2. CISCO Network Design Handbook, Michal Salvagno IDG books, Delhi.

Title of the course : **Network Operating System**

Subject Code : **CS-222**

**Course Outcomes:** At the end of the course, the student will be able to:

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| --- | --- |
| CO1 | Describe and use the Linux operating system and are familiar with the fundamentals of Linux system tools and utilities. |
| CO2 | Write shell scripts in order to perform basic shell programming. |
| CO3 | Describe and understand the Linux file system. |

**LIST OF PRACTICALS**

1. Creating and managing user accounts

2. Practice on Linux commands

3. Installation of Linux Operating system

4. Write and execute at least 10 programs in Linux using shells such as

- Factorial of numbers

- Even/odd numbers

- Fibonacci series -

- Prime numbers

- Arrange the numbers -

- Reverse of numbers

- Lower case to upper case

- Greatest of three numbers etc.

5. Installing and configuring X-windows

6. Create file and folder

7. Searching a file

8. Installation of device drivers

9. Creating user accounts

10. Customizing desktop

Title of the course : **Computer Architecture & Organisation**

Subject Code : **CS-223**

Weekly load : 3 Hrs LTP 3-0-0

Credit : 3 (Lecture 3)

**Course Outcomes:** At the end of the course, the student will be able to:

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| CO1 | Make the students aware about the working of computer system and its organization. |
| CO2 | Give basic introduction about data representation and digital electronic circuit. |
| CO3 | Design the Hardwired and Micro programmed Control Unit. |
| CO4 | Make the students familiar with memory organization. |
| CO5 | Understand the interfacing of I/O. |

**Theory**

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| **Unit** | **Main Topics** | **Course outlines** | **Lecture(s)** |
| **Unit-1** | 1.Introduction | Computer Architecture and Organization, Historical overview, Economic trends, Digital computer generation, Computer types and Classifications, Functional units and their interconnections | 06 |
| 2.Data Representation and Algorithms | Number system, Complements, Data representation, Fixed and floating point representation, Error Detection and Correction, Addition, Subtraction, Multiplication, Division algorithms | 06 |
| 3.Basic digital electronics | Logic gates, Flip flops, Registers, Counters, Multiplexer, De-multiplexer, Decoder, Encoder, half adder and full adder | 06 |
| 4.Instruction | Instruction format, Instruction types, Steps of instruction execution, Introduction to memory, register reference and I/O instructions, Introduction to RTL | 06 |
| **Unit-2** | 5.CPU Organization | General Register and Stack, Register set of a basic system, Direct and Indirect addressing, Addressing Modes, Data Transfer and Manipulation, Interrupt and interrupt execution cycle | 07 |
|  | 6.Control unit Organization | Introduction to hardwired and micro programmed control unit organization | 04 |
| 7.Input /Output Transfer | Introduction to I/O interfacing, Asynchronous data transfer, Modes of data transfer | 06 |
| 8.Memory Organization | Memory Systems: principle of locality, principles of memory hierarchy Caches, associative memory, main memory, Virtual memory, Paging and Segmentation | 07 |

**Total=48**

**Recommended Books:**

1. Stalling ,Computer Organisation, TMH
2. John. P. Hays, Computer Architecture and Organisation, McGraw Hill
3. M.Mano, Computer Architecture and Organisation, PHI

Title of the course : **Computer Networks**

Subject Code **: CS-224**

Weekly load : 5 Hrs LTP 3-0-2

Credit : 4 (Lecture 3, Practical 1)

**Course Outcomes:** At the end of the course, the student will be able to:

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| CO1 | Understand data communications system, its component and to identify the different type of network topologies and transmission mediums. |
| CO2 | Understand the basic concept of serial and parallel communication, transmission modes and interface standards. |
| CO3 | Understand multiplexing and modulation techniques and basic protocols of computer networks, and how they can be used to assist in network design and implementation. |
| CO4 | Analyze the services and features of various layers of OSI and TCP/IP models. |

**Theory**

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| **Unit** | **Main Topics** | **Course outlines** | **Lecture(s)** |
| **Unit-1** | 1. Data Communication | Introduction to data communication, Analog Vs Digital communication, transmission media, Network Topology. | 08 |
| 2. Synchronous  and Asynchronous systems | Data rates, serial and parallel communication, concepts of simple, half duplex and full duplex modes. | 06 |
| 3. Interface Standards | Introduction to RS-232, RS-232 voltages, data bits, RS-232 signals, RS-232 interconnection. | 06 |
| **Unit-2** | 4. Multiplexing and Modulation techniques | Frequency Division Multiplexing, time division multiplexing, and wavelength division multiplexing, Digital modulation techniques: ASK, FSK, PSK, and QPSK | 08 |
|  | 5. Basics of Networks | Basic network protocols and access, media and physical interconnection. Local Area networks (LAN), IEEE 802 standards. Packet switching, message switching and circuit switching. Introduction to hubs, routers, bridges, gateways. | 12 |
| 6. Network Models | Introduction to OSI/ISO reference model and TCP/IP model. | 08 |

**Total=48**

**Recommended Books:**

1. B. Forouzan, Data Communication And Networking, TMH
2. William Stalling, Data and Computer Communication, Prentice Hall
3. Douglas E. Comer, Internetworking with TCP/IP Volume  I, Prentice Hall India
4. W. Richard Stevens, TCP/IP Illustrated Volume-I, Pub. Addison Wesley
5. Tanenbaum, Computer Network, Prentice Hall India

Title of the course **: Computer Networks Lab**

Subject Code : **CS-224**

**Course Outcomes:** At the end of the course, the student will be able to:

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| --- | --- |
| CO1 | Understand the fundamental concepts of computer networking. |
| CO2 | Implement the topologies and different protocols of data link layer. |
| CO3 | Identify the various networking devices. |

**LIST OF PRACTICALS**

1. Overview of various transmission modes.

2. Study of transmission medias e.g. wired, wireless etc.

3. Study of various Multiplexing techniques.

4. Realization and overview of different LAN topologies.

5. Overview of Digital Modulation Techniques.

6. Overview and comparison of different LAN technologies e.g. Ethernet, token ring, wifi.

7. Introduction to Hub, Router, Bridge and Gateway.

8. Implementation of data link layer protocols:

a) Stop & Wait,

b) Go back by N,

c) Selective Repeat.

9. Comparison of performance of all data link layer protocols.

Title of the course : **System Installation and Maintenance**

Subject Code : **CS-225**

Weekly load : 6 Hrs LTP 2-0-4

Credit : 4 (Lecture 2, Practical 2)

**Course Outcomes:** At the end of the course, the student will be able to:

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| CO1 | Understand the functioning of various hardware components of computer and the installation procedure of operating systems & drives required for functioning of the devices. |
| CO2 | Understand the installation procedure of the latest software, peripheral devices and the modems. |
| CO3 | Understand about computer hardware and the installation procedure of system software and application software. |

**Theory**

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| **Unit** | **Main Topics** | **Course outlines** | **Lecture(s)** |
| **Unit-1** | 1. Introduction & functioning | Functioning of various hardware components i.e. CPU, RAM, ROM, Mother Board (AT, ATX, NLX), power supply | 04 |
| 2. Introduction & functioning | Ports (serial, parallel, USB etc), CD-ROM drive, sound card , LAN card | 04 |
| 3. Installation of various operating systems | The necessary steps for loading of various operating systems to a new computer system:   1. DOS / Linux / Unix 2. Windows XP 3. Window NT-Workstation / Server 4. Windows Vista / 7 | 07 |
| 4. Installation procedure for various drives | Installation procedure for various drives required for the functioning of various devices, i.e. CD-ROM, MOUSE and VGA or (Graphics Acceleration Card). | 04 |
| **Unit-2** | 5. Installation of various software packages | Installation of MS-Office 2003/2007/2010, Flash Player, Photoshop, Antivirus in the system | 07 |
| 6. Installation of peripheral device | Installing of Digital Camera / Web Camera | 02 |
| 7. Installation of Printer | Installing various printers and activating them to print text pages. | 02 |
| 8. Installation of Modem | Installing an internal and external modem to a system including configuring the port to which the modem is connected. | 02 |

**Total=32**

**Recommended Books:**

1. W. L. Rosch, Hardware Bible, Que
2. Muller & Zacker, Upgrading and Repairing PCs, PHI

Title of the course **: System Installation and Maintenance Lab**

Subject Code : **CS-225**

**Course Outcomes:** At the end of the course, the student will be able to:

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| CO1 | Install the various Operating systems like Windows, Linux |
| CO2 | Install the latest softwares, peripheral devices and the modems. |

**LIST OF PRACTICALS**

1. Installing and study different functions of various hardware components.
2. Installation of DOS.
3. Installation of Windows XP.
4. Installation of Windows 2000 Professional.
5. Installation of MS-Office 97/2000.
6. Installation of MS- visual studio in the system.
7. Installation procedure of CD-ROM,
8. Installation procedure of MOUSE and study the different parts of MOUSE.
9. Installation procedure of Display device.
10. Installing various printers.
11. Installing an Internal modem to a system including configuring the port to which modem is connected.
12. Installing an External modem to a system including configuring the port to which modem is connected.
13. Study the different types of motherboard.
14. Installation of USB port.
15. Explore the steps for booting.
16. Understand the concept of BIOS, MBR and boot loader.

Title of the course : **Desktop Publishing Lab**

Subject Code : **CS-226**

Weekly load : 4 Hrs LTP 0-0-4

Credit : 2 (Practical 2)

**Course Outcomes:** At the end of the course, the student will be able to:

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| CO1 | Develop comprehensive understanding of the mechanics associated with desktop publishing. tools. |
| CO2 | Develop an understanding of basic desktop publishing software to effectively communicate messages in printed form. |
| CO3 | Make the students familiar with basic principles of layout and design in desktop publishing environments like Page Maker and CorelDraw. |
| CO4 | Use principles of good page layout and design to create single and multiple page documents containing graphic illustrations. |

**LIST OF PRACTICALS**

**Perform the following practicals using Page Maker:**

1. Create a document.
2. Editing and formatting a document.
3. Inserting images and graphics from a drawing package in the document.
4. Study the different types of tools.
5. Study the transparencies.
6. Create the columns, fonts and styles.

**Perform the following practicals using Corel Draw:**

1. Exploring screen.
2. Study the different types of tools.
3. Arranging and formatting objects.
4. Create objects and shaping of objects using zoom tool.
5. Explore different types of page settings.
6. Study the use of Ribbon bar and flying tool.
7. Study the different types of frame settings of tabs, bullets and paragraph text.
8. Create pattern using the tools.
9. Create text and text settings example spacing in paragraph text.
10. Create multipage document.
11. Study the exporting and importing the files.
12. Create order group and ungroup.
13. Study the different types of software of desktop publishing.
14. Study the different types of mode edits.