

BSc 5 th Semester		Operating Systems and Computer Networks	
Subject Code :	16SE74/5	Total Teaching Hours :	39
IA Marks :	20	Teaching Hours/Week :	03
Exam Marks :	80	Examination Hours :	03
Credits:	3		

- 1. Introduction:** What Operating Systems Do, Computer System Organization, Computer System Architecture, OS Structure, OS Operations, Protection and Security, Distributed Systems, Special-Purpose Systems, Computing Environments. 8hrs
- 2. Process Management:** Overview, Process Scheduling, Operations on Processes, IPC, Examples of IPC Systems, Communication in C/S Systems, Multithreaded Programming, Overview, Multithreading Models, Thread Libraries, Threading Issues, OS Examples. Process Scheduling, Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Thread Scheduling, OS Examples, Algorithm Evaluation. 10hrs
- 3. CPU Scheduling:** Scheduling concepts, algorithms, performance criteria, FCFS, shortest job first, priority scheduling, round robin algorithm. 6 Hrs
- 4. Deadlock:** Deadlock problems, deadlock characteristics, deadlock prevention and avoidance, Deadlock detection and recovery from deadlock. 6hrs
- 5. Computer networks Introduction:** Introduction, goals of computer networks, Social Issues, Network hardware: Types: -Broadcast, point to point network, LAN, WAN, MAN, wireless network, internet. Network Software: Design issues, connection oriented and connectionless services. Reference Models: OSI and TCP/IP Comparison. 6hrs
- 6. Transmission Media:** Magnetic media, twisted pair, coaxial cable, fiber optics. 3hrs

Text books:

1. Computer Networks, 4th edition, Pearson Education, Andrew S. Tanenbaum.
2. Abraham Silberschatz and Peter Baer Galvin, Greg Gagne, "Operating System Principles". Seventh edition

BSc 5 th Semester		Operating Systems and Computer Networks Lab	
Subject Code:	12SE74/5	Total Teaching Hours:	39
IA Marks:	10	Teaching Hours/Week:	03
Exam Marks:	40	Examination Hours:	03
Credits:	3		

1. Program to implement FCFS CPU scheduling Algorithm.
 2. Program to implement SJF CPU scheduling Algorithm.
 3. Program to implement Priority CPU scheduling Algorithm.
 4. Program to implement RR C/P scheduling Algorithm.
 5. Program to illustrate Deadlock
 6. Programs on Process scheduling.
 7. Programs demonstrating Multi threads.
- Programs May be implemented using any of the programming Language C/ Java.

Examination:

- One Question has to be given from the above list (Carries 25 Marks)
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	
	Execution	10	10
	Total		5
IA -Viva/Report			40
Total			10
			50

BSc 5 th Semester		PHP and MySQL	
Subject Code :	16SE74/6.1	Elective	6.1
IA Marks :	20	Total Teaching Hours :	39
Exam Marks :	80	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

- HTML:** Introduction, Elements, Tags, Attributes, Paragraph, Headings, Line Breaks, Horizontal Rule, Lists, Formatting, Color Codes, Font, Text Links, Email, Images, Image Link, Forms, Table, Frames. 4hrs
- Introduction:** Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, The Building Blocks & Flow Control functions in PHP : Variables Data types, Operators and Expressions, Constants switching, Flow Loops, Code Blocks and Browser Output. 6Hrs.
- Working with Functions, Arrays and Objects:** Function, Calling Function, Defining a Function, Returning Values from User Defined Functions, Variable Scope, Saving State between Function Calls with the static statement, More about Arguments, Testing for the existence of a Function. Arrays: Creating, Array related Constructs and Functions. Object : Creating, Inheritance. 08Hrs
- Functions with Forms Cookies and User Sessions:** Creating simple input form, accessing form input with User-Defined Arrays, Combining HTML and PHP Code on a Single Page, Using Hidden fields to save state. Redirecting the User. Sending mail on form submission, creating the form, creating the script to send the mail working with file uploads. Cookies: Setting up and Deleting a cookie with PHP. Session function overview, starting and working with a session variables. Destroying sessions and Unsetting variables, using sessions in an environment with registered users. 08Hrs
- Working with files,directories & Images.** Including files, Using include_once. Validating Files, Creating and Deleting Files, opening a file for writing reading or appending, reading from files, writing , appending to a file. Working with directories: opening pipes to and from processes using popen(), running commands with exec(), running commands with system() or passthru(), understanding the image creation process, necessary modifications to PHP, Drawing a New Image,Modifying existing Images, Image creation from User Input, Using Images Created By Scripts. 06Hrs
- Database Design Process & Basic SQL Commands** The importance of good database design, Types of table relationships, understanding Normalization Following the design Process, Learning the MySQL Data Types, Table Creation Syntax, Insert Command, Select Command, Where, Selecting from Multiple Tables, Using UPDATE command to modify Records, Using REPLACE, DELETE Commands. Frequently used string Functions, Date and Time Functions in MySQL 07Hrs.

Text Books:

- PHP, MySQL and Apache ALL in ONE by Julie C Meoni, SamsTeach Yourself.
- PHP 5 and MySQL Bible 1st Edition By Joyce Park with Clark Morgan, Tim Converse.

BSc 5 th Semester		PHP and MySQL Lab	
Subject Code :	16SE74/6.1	Elective	6.1
IA Marks :	10	Total Teaching Hours :	39
Exam Marks :	50	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

LAB PROGRAMS

1. Program to find largest among three numbers using ternary operator.
2. Program to print sum of digits of a given number using While Loop.
3. Program to print fibonacci series upto a given number.
4. Program to generate prime number upto a given number.
5. Program to enter numbers in an array, and then display the count of positive and negative and zeros in that array (using do-while loop)
6. Function to count number of occurrences of each word from a string of characters inputted (Not Case sensitive).
7. Form to find string length, reverse of string, Uppercase of the string, lowercase of string, using the text entered in a text field.
8. Program using javascript to convert decimal number to its binary equivalent. Use an html form to accept number from the user.
9. Program to store current date-time in a Cookie and display the last visited on [], date time on the reopening of same webpage again.
10. Program to store page views count in SESSION, to increment the count on each refresh, and to show the count on the web page.
11. PHP code that define class student with attributes RollNo, Name, Branch, and Year, create 3 instances of it, sets the values of each instance appropriately and print the values of all attributes and store it in database.
12. PHP function for searching and deleting a student information based on rollNo for the above program (Prog No 11).
13. Program using PHP and MySQL, to accept book information viz. Accession number, title, authors edition and publisher from a web page and store the information in a database and to search for a book with title specified by the user to display the search results with proper headings.

Examination:

- One Question has to be given from the above list (Carries 25 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	10
	Execution	10	5
	Total	40	
IA - Viva/ Report		10	
Total		50	

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BSc 5 th Semester		.NET Framework Using C# Programming	
Subject Code :	16SE74/6.2	Elective	6.2
IA Marks :	20	Total Teaching Hours :	39
Exam Marks :	80	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

- The Philosophy of .NET:** The .NET Solution, Introducing the Building Blocks of the .NET Platform (CLR,CTS, and CLS), An Overview of .NET Assemblies, Installing the .Net Framework 2.0 SDK , C# command line compiler, Building C# application using csc.exe, Building .Net applications using Visual Studio IDE, C# Language Fundamentals: Anatomy, The System.Environment Class, Defining Classes and Creating objects, The System.Console Class, Member Visibility, Default Values of Class Member Variables, Member Variable Initialization Syntax, Defining Constant Data, Defining Read-only fields, Understanding static keyword, Method Parameter Modifiers, Iteration Constructs, Decision Constructs and the Relational/Equality Operators, Understanding Value Types and Reference Types, Understanding Boxing and Unboxing Operations, Working with .NET Enumerations, The Master Class: System.Object, Overriding default behaviours of System.Object, The System Data types(and C# Shorthand notation), The System.String data types, The role of System.Text, StringBuilder, .NET Array Types, Understanding C# Nullable Types, Defining Custom Namespaces. **10 Hrs**
- Object- Oriented Programming :** Understanding the C# Class Type, Reviewing the Pillars of OOP, C#'s Encapsulation Services, C#'s Inheritance Support, Programming for Containment/Delegation, C #'s Polymorphic Support, C# Casting rules, Understanding C# Partial types, Documenting C# Source Code via XML, Understanding Object Lifetime Classes, Objects and References, the basics of Object Lifetime, System.GC type, Building Finalizable Objects, Building Disposable Objects. **08 Hrs**
- Exception Handling:** Ode to Errors, Bugs, and Exception , The Role of .NET Exception Handling, The Simplest possible example, throwing generic exceptions, catching exceptions, Configuring the state of an exception-Target Site , Stack trace, Helplink & Data property System - Level Exception (System.Exception), Application-Level Exception (System.ApplicationException), Processing Multiple Exception, Generic catch statements, Rethrowing exceptions, Inner exceptions, The Finally Block, Who is throwing what?, The result of unhandled exceptions, Debugging Unhandled exceptions using VS. .NET IDE. **6 Hrs**
- Interfaces, Collections, Delegates & Events:** Defining Interfaces in C#, Implementing an Interface in C#, Contrasting Interfaces to Abstract Base Classes, Invoking interface Members at the Object Level, Interfaces As Parameters, Interfaces As Return Values, Arrays of Interfaces Types, Understanding Explicit Interface Implementation, Building Interface Hierarchies System.Collections Namespace, Building Enumerable Types(IEnumerable, IEnumerator, ICollection, IComparable), The Interfaces of the System.Collections Namespace, .NET Delegate type, Defining a Delegate in C#, The System.MulticastDelegate and System.Delegate Base Classes Delegate examples, C# Events, Anonymous Method, C# Method Group Conversions **08 Hrs**
- Understanding .NET Assemblies & Libraries:** The Role of .NET Assemblies, Understanding the format of .NET Assemblies, Building and Consuming a Single- File Assembly, Building and Consuming a Multi-File Assembly, Shared Assemblies, The System IO Namespace, Directory (Info) and File (Info) types, Working with DirectoryInfo, Directory Type, FileInfo, FileType Class, Abstract Stream Class, StreamWriters and StreamReaders, StringWriters and StringReaders, BinaryWriters and BinaryReaders, Programmatically watching files. **07 Hrs**

Text Books

- Andrew Troelsen: Pro C# with .NET 3.0, Special Edition aPress India, 2007

Reference Books:

- E. Balagurusamy: Programming in C#, 5th Reprint, Tata McGraw Hill, 2004.
- Herbert Schildt The Complete Reference C#, Tata McGraw H.I. 2004
- C# 2008 programming cogent learning solutions Inc. Dreamtch Press.

BSc 5 th Semester		.NET Framework Using C# Programming Lab	
Subject Code:	16SE74/6.2	Elective:	6.2
IA Marks:	10	Total Teaching Hours:	39
Exam Marks:	40	Teaching Hours/Week:	03
Credits:	3	Examination Hours:	03

WEB PROGRAMMING AND C# Lab.

Note: All the asp.net programs must be implemented using c#.net C# Programming

1. Write a C# Program to accept a string and then check whether each word is palindrome or not.
2. Write a C# program to demonstrate a basic calculator using command line arguments.
3. Write a C# program to input real numbers and find the mean, variance and standard deviation.
4. Write a C# program to demonstrate boxing and unboxing concepts.
5. Write a C# program to show the machine details like machine name, Operating System, Version, Physical Memory and calculate the time since the Last Boot Up. (Hint: Use System Environment Class)
6. Write a C# program to find the sum of all the elements present in jagged arrays of 3 inner layers.
7. Write a C# program to find the second largest element in a single dimension array.
8. Write a C# program to demonstrate the use of in, out and ref variables.
9. Create C# program with a Class named Employee and attributes like SSN, Name, Address, DOB, Sex, Salary, Age. This class must also perform adding and deleting of employees with following constraints a. Using properties validate date of birth of employee and also calculate the age automatically. b. The program must also have a method which calculates the gross salary by taking basic salary as input.
10. Using Try, catch and Finally block, write a program in C# to demonstrate error handling.

Web Programming :

1. Write ASP.NET program to accept the User Name and display a greeting message randomly chosen from a list of 4 greeting messages.
2. Write ASP.NET program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper heading.
3. Write ASP.NET program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page.
4. Write ASP.NET program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.
5. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in SQLSERVER table. Retrieve and display the data based on Name.
6. Using ASP.Net and SqlServer, develop a program to accept book information viz Accession number, title authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.

Examination:

- One Question from C# or Web programming has to be given from the above list (Carries 25 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	10
	Execution	10	5
	Total		40
IA - Viva/ Report			10
Total			50

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BSc 5 th Semester		Programming With Visual Basic.Net	
Subject Code :	16SE74/6.3	Elective	6.3
IA Marks :	20	Total Teaching Hours :	39
Exam Marks :	80	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

- 1. Visual Basic .NET and the .NET Framework.** Introduction to .net framework -Features, Common Language Runtime (CLR) , Framework Class Library (FCL), Visual Studio.Net – IDE, Languages Supported, Components. Visual Programming, VB.net- Features, IDE- Menu System, Toolbars, Code Designer, Solution Explorer, Object Browser, Toolbox, Class View Window, Properties Window, Server Explorer, Task List, Output Window, Command Window. **(4 Hours)**
- 2. Elements of Visual Basic .net** Properties, Events and Methods of Form, Label, TextBox, ListBox, Combo Box, Radio Button, Button, Check Box, Progress Bar, Date Time Picker, Calendar, Picture Box, HScrollbar, VScrollbar, Group Box, ToolTip, Timer. **(8 Hours)**
- 3. Programming in Visual basic .net** Data Types, Keywords, Declaring Variables and Constants, Operators, Understanding Scope and accessibility of variables, Conditional Statements- If- Then, If-Then-Else, Nested If, Select Case, Looping Statement- Do loop, For Loop, For Each-Next Loop, While Loop, Arrays- Static and Dynamic. **(5 Hours)**
- 4. Functions, Built-In Dialog Boxes, Menus and Toolbar** Menus and toolbars- Menu Strip, Tool Strip, Status Strip, Built-In Dialog Boxes – Open File Dialogs, Save File Dialogs, Font Dialogs, Color Dialogs, Print Dialogs, InputBox, MsgBox, Interfacing With End user- Creating MDI Parent and Child, Functions and Procedures- Built-In Functions- Mathematical and String Functions, User Defined Functions and Procedures. **(6 Hours)**
- 5. Advanced Concepts in VB.Net** Object Oriented Programming- Creating Classes , Objects, Fields, Properties, Methods, Events, Constructors and Destructors, Exception Handling- Models, Statements, File Handling- Using File Stream Class, File Mode, File Share, File Access Enumerations, Opening or Creating Files with File Stream Class, Reading and Writing Text using StreamReader and StreamWriter Classes. **(10 Hours)**
- 6. Data Access with ADO.Net – Databases.** Data Access with Server Explorer, Data Adapter and DataSets, ADO.NET Objects and Basic SQL. **(6 Hours)**

Text Books:

1. Visual Basic.Net: Black Book by Steven Holzner Dreamtech Press
2. The Complete Reference Visual Basic .NET Jeffery R. Shapiro Tata McGraw Hills

Reference Books:

1. Murach's Beginning Visual basic .Net By Anne Bohem
2. Visual Basic .Net by Vijay Mukhi

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BSc 5 th Semester		Programming With Visual Basic.Net Lab	
Subject Code :	16SE74/6.3	Elective	6.3
IA Marks :	10	Total Teaching Hours :	39
Exam Marks :	40	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

Practice Programs:

1. Write a program to convert a given temperature from Fahrenheit to Celsius and viceversa.
2. Write a program to accept roll number, name, marks in 2 subjects of a student and calculate total average and display the grade. (using nested if)
3. Write a program to generate n random numbers .(using rnd() function)
4. Write a program to find frequency of a given character in a string .(using for each loop)
5. Write a program to accept array elements and find the minimum and maximum among them.

Journal Programs:

1. Design an application to create a login form and validate it using msgbox.
2. Design an application to simulate the working of a font dialog box using combo box.
3. Design a reminder application to schedule a meeting using calendar and input box.
4. Design a screen saver application using timer control.
5. Design an application to create an MDI form having a menu with options- programs and exit. The program menu should have sub menu items that calls separate child forms such as Fibonacci and factorial.
6. Design an Pizza Order application using check box and radio buttons and also generate a bill for the same.
7. Design a color pallet application using scroll bars.
8. Design an application which calculates EMI of a loan using functions.
9. Design an application to implement various string operations such as reversing, case conversion, length, concatenation
10. Write a program to accept sides of a triangle and then find its area, perimeter and type of triangle using classes (OOP).
11. Design an application to open a text file, modify it and save the changes using built in dialog boxes.
12. Write a program to perform various arithmetic operations and implement exception handling
13. Design a Student Registration Application to store the student data in the database using ADO Net

Examination:

- One Question has to be given from the above list (Carries 25 Marks)
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	10
	Execution	10	5
	Total		40
IA - Viva/ Report			10
Total			50

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BSc 5 th Semester		Object Oriented Programming with C++	
Subject Code :	16SE74/6.4	Elective	6.4
IA Marks :	20	Total Teaching Hours :	39
Exam Marks :	80	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

- 1. Introduction to OPP:** Programming paradigms: -Procedure oriented programming (POP), Object oriented programming (OOP), Basic concepts of OOP and Features: - Objects, Classes, Abstraction and Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing / Communication. Benefits of OOP, object oriented languages, Applications of OOP. 8 Hrs
- 2. C++ Programming:** Introduction, C++ Features, C with classes, applications of C++, Data Types, Literals, constants, variable, pointer types, type definition, string types, constant qualifier, reference types, enumeration types, array types, input/output operators, structure of C++ program, key words, symbolic constants, type compatibility, declaration of variable, reference variables, operators in C++, control structures. 8 Hrs
- 3. Functions:** Overview of functions, return types, function prototyping, call by reference, call by value, return by Reference, inline functions, default arguments, constant arguments, function overloading, friend function and virtual function. 6 Hrs
- 4. Classes and Objects:** Introduction, Limitations of C Structures, Specifying a Class, creating object, Defining a Member Function, Making an Outside Function inline, Nesting of Member Functions, private member functions, Arrays within a Class, Memory Allocation for Objects, Static Data Members, Static Member Functions, Array of Objects, Objects as Function Arguments, Friendly Functions, Returning Objects, Constant Member Functions, Pointers to Members, Local Classes 8 Hrs
- 5. Constructors and Destructors:** Introduction, Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructors, Dynamic Constructors, Constructing 2-D Arrays, Constant Objects, and Destructors. 6 Hrs
- 6. Operator Overloading and Type Conversion:** Introduction, Definition, rules, unary operators overloading, and Binary operator overloading Using Member Function and friend functions. Mention operators, which are not possible to over load, Manipulation of Strings using Operators, type conversion. 8 Hrs
- 7. Inheritance and Templates:** Introduction, definition, types of inheritance, virtual base class, abstract class, Defining derived class constructors, member classes: - nesting of classes. **Templates:** Introduction, class templates, class templates with multiple parameters, function templates, function templates with parameters. 8 Hrs.

Text Books:

1. Object oriented Programming with C++ -- E Balagurusamy
2. Object oriented Programming with C++, "P.B. Kotur"
3. Object oriented Programming with C++, "Rabort Lafor"

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BSc 6 th Semester		Object Oriented Programming Using C++ Lab	
Subject Code :	16SE74/6.4	Elective	6.4
IA Marks :	10	Total Teaching Hours :	39
Exam Marks :	40	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

- Given that an Employee class contains the following members: Data members: Employee_number, Employee_name, basic, DA, IT, Net_salary. Member functions: to read the data, to calculate net_salary and to print data members. Write c++ program to read the data of N employees and compute Net_salary of each employee. (Dearness allowance (DA)=52% of basic and income tax (IT) =30% of gross salary, Net_salary = basic-DA-IT)
- Define a STUDENT Class with USN, name, and marks in 3 tests of a subject. Declare an array of 10 STUDENT objects. Using appropriate functions. Find the average of two better marks for each student. Print USN, name and the average marks for all the students.
- Write a c++ program to create a class called COMPLEX and implement the following overloading functions ADD that return a Complex number.
 - ADD (a, S₂): where 'a' is an integer (real part) and s2 is a complex number.
 - ADD (S₁, S₂): where S₁ and S₂ are Complex numbers.
- Define a class P to calculate remainder and class Q to calculate Quotient inherit the class P and Q to reverse the given integer and check for palindrome.
- WAP to search an element in an array using template function for searching an integer, character and double.
- WAP to create a template function for Quick sort and demonstrate sorting of integer and double.
- WAP to create a class called STRING and implement the following operations. Display the results after every operation by overloading the operator <<.
 - STRING S₁="VTU".
 - STRING S₂="BELGAUM".
 - STRING S₃= S₁+S₂; (Use copy constructor).
- WAP to create a class called OCTAL, which has the characteristics of an OCTAL number. Implement the following operations by writing an appropriate constructor and an overloaded operator +.
 - OCTAL h=x; where x is an integer
 - int y= h+k; where h is OCTAL object and k is an integer.
 Display the OCTAL result by overloading the operator << and also display the values of h and y.
- WAP to create a base class called STUDENT with data members USN, name and age. Using inheritance, create classes UGSTUDENT and PGSTUDENT having fields as semester, fees and stipend. Enter the data for at least 5 students. Find the semester wise average age for all UG and PG students separately.
- Write a Program to create a class called STACK using array of integers. Implement the following operations by overloading the operators + (plus) and - (minus).
 - s1 = s1 + element; where s1 is an object of the class STACK. Element is an integer to be pushed on to top of the Stack.
 - s1=s1--; where s1 is an object of the class STACK and -- operator pops the element.
 Handle STACK EMPTY and STACK FULL conditions. Also display the contents of the stack after each operation by overloading the operator <<.
- Write function using polymorphism
 - Reverse an integer.
 - Reverse a floating-point numbers.
 - Reverse a String.
- WAP to read a String by overloading unary +. This function has to read String character at a time and after reading each character. Array index should be incremented by 1. Using this function implement

String copy. Strings compare and String concatenation by overloading assignment (=), equality (==) and addition (+) operator respectively.

13. WAP to concatenate two Strings by overloading + operator then sort the concatenate String in alphabetical order by over loading < or > operator (use String and its length as operands).
14. Let ADD be a class with member function addmat(). MUL be a class with member function mulmat(). Let readmat() and printmat() be two friend functions to both the classes using the above concept WAP to find the sum and product of two matrices function. Take different matrices for addition and multiplication.
15. Define a class to represent a bank account, which includes the following Data members: name of depositor, account number, balance account, type of account. Member function: initialize values, to deposit an amount, to withdraw an amount after checking the balance to display name, balance accno, type
16. Write a class to represent a generic Vector (a series of values). Include member functions to perform the following tasks.
 - A. To create a Vector.
 - B. To modify the value of given element.
 - C. To modify by a scalar value.
 - D. To display the vector in the form (10 20 30...).
 Define a friend to add two Vectors. Test the program for at least two types of values stored in the Vector.
17. WAP to implement the linked implementations of Queue using class templates for the operations Cinsert, Qdelete, Qdisplay and it also check for Qempty and Qfull
18. A Bookshop maintenance the inventory of books that are begin at the shop. The list includes details such as author, title, prize, publisher and stock position. Whenever a customer's wants a book the sale person inputs the title and author and the system searches the list and display whether it is available or not. If is it not, an appropriate message is displayed if it is then the system displace the book.
19. WAP to create a class called LIST (linked list) with member functions insert an element at the front of the list as well as to delete an element from the front of the list. Demonstrate all functions after creating a list object.
20. Write a C++ Program to create a base class called EXPRESSION. Using appropriate member functions convert a given valid infix expression into postfix form. Display the infix and postfix expressions.

Examination:

- One Question has to be given from the above list (Carries 25 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Mark	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	10
	Execution	10	5
	Total	40	
IA - Viva/ Report		10	
Total		50	

BSc 6 th Semester		Software Engineering	
Subject Code :	16SF74/7	Total Teaching Hours :	39
IA Marks :	20	Teaching Hours/Week :	03
Exam Marks :	80	Examination Hours :	03
Credits:	3		

- 1. Introduction:** Software definition, The Software Problems, Software Engineering Problems, Phased Development Process, Project Management and Metrics. 5Hrs.
- 2. Software Process:** Software Process, Process models, Build and fix, The waterfall, Prototyping, Interactive, Evolutionary development, Spiral, Rapid Application Development[RAD] Selection of a life cycle model, characteristics of requirements, status of development team, involvement of users, type of project and risk. 8Hrs
- 3. Software requirements analysis and specification:** Software Requirements: Need for SRS, Problem Analysis: Analysis Issues, Informal approach, Structure Analysis, DFD, Requirements Specification Characteristics and components of SRS, Structure of SRS document, Validation. 8Hrs
- 4. Software Design:** Design concepts and techniques, objects and importance, modularity, strategy of design, function oriented design, IEEE recommended practice for software design and object oriented design. 8Hrs
- 5. Coding:** Programming Practice: Top-Down and Bottom-Up, Structured Programming, Information Hiding, Programming Style, Internal Documentation 5Hrs
- 6. Software Testing:** Testing process, terminologies, introduction to functional and structural testing, levels of testing, debugging and testing tools 5Hrs

Text Books:

1. Software Engineering – K K Aggarwal & Yogesh Singh.
2. Software engineering – a practitioners approach – Roger Pressman.

BSc 6 th Semester		Project Work	
Subject Code :	16SF74/7	Total Teaching Hours :	39
IA Marks :	10	Teaching Hours/Week :	03
Exam Marks :	40	Examination Hours :	03
Credits:	3		

A Team of 1 to 4 students must develop the project. However, during the examination, each student must demonstrate the project individually.

The Team may implement a project of their choice.

The team must submit a Project Report that must include the following: 1. Introduction, 2. Requirements, 3. Software Development Process Model Adopted, 4. Analysis and Design Models, 5. Implementation, 6. Testing and conclusion.

Examination:

- Student has to write description about his project based on the questions given by the examiner
- Each individual team member has to demonstrate the project.

Marks Distribution:

Exam	Marks
Write Up	20
Demonstration	20
IA- Report	10
Total	50

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BSc 6 th Semester		Network Programming with TCP/IP	
Subject Code :	16SF74/8.1	Elective:	8.1
IA Marks :	20	Total Teaching Hours :	39
Exam Marks :	80	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

- 1. INTRODUCTION TO TCP/IP:** Origin of TCP/IP and Internet, Communication, Why do we Need the Internet, Need of Protocol on Communication, Problem in Computer Communication, Dealing with Incompatibility, A Brief History of the Internet, Architecture of the Internet, TCP/IP Layer and Protocols, Network Access Layer, Internet Layer, Need for IP Address, Classes of IP Address, Special Meanings, Who Decides the IP Addresses, Internet Protocol, Address Resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Internet Control Message Protocol (ICMP), Transport Layer Transmission Control Protocol, User Datagram Protocol (UDP), Application Layer, Electronic Mail, Domain Name System (DNS), How does the DNS Server Works? Simple Network Management Protocol (SNMP), Remote Login: TELNET, World Wide Web: HTTP, Networking Example. 8Hrs
- 2. INTERNET PROTOCOL:** Overview of Internet Protocol (IP Header, IP Address, IP Address Classes, Subnet Masks and CIDR Networks (Classless IP Addressing), Internet-Legal Versus Private Addressing, IP Routing, Routing Protocol, Routing Algorithms. 6Hrs
- 3. TRANSPORT LAYER PROTOCOLS:** Overview of TCP Transmission Control Protocol (TCP), TCP Header, TCP Connection Establishment and Termination, TCP Connection Establishment, TCP Connection Termination, User Datagram Protocol (UDP). 6Hrs
- 4. APPLICATION LAYER PROTOCOLS:** Domain Name System (DNS), Hierarchical Name Space, Domain Servers, How does DNS Work in Internet, Domain Name Resolution, Messages Used in DNS, Dynamic DNS (DDNS), Electronic Mail, Simple Mail Transfer Protocol (SMTP), Message Transfer Agent, User Agent, Post Office Protocol (POP), Internet Mail Access Protocol (IMAP), Multipurpose Internet Mail Extension (MIME), Telnet, File Transfer Protocol (FTP). 6Hrs
- 5. TCP/IP PROGRAMMING CONCEPTS:** Client Server Communication, Designing Client/Server Programs, Socket Concepts, IP Address and Ports, Byte Ordering, Sketch of Networking Connection, Active and Passive Sockets, Socket Fundamentals, Networking Example. 4Hrs
- 6. SOCKET INTERFACE:** Elementary Socket System Calls, Socket System Call, Bind System Call, Connect System Call, Listen System Call, Accept System Call, Elementary Data Transfer Calls, Closing a Socket, TCP and UDP Architectures, Networking Example. 5Hrs
- 7. SOCKET PROGRAMMING:** Advance System call, Data Transfer, Byte Operations and Addressing, Socket Options, Select System Call Raw Socket, Multiple Recipients, Unicasting, Broadcasting, Multicasting, Quality of Service Issues. 4Hrs

Text Books:

1. Advance UNIX Programming Richard Stevens, Second Edition Pearson Education.
2. Advance UNIX Programming, N.B. Venkateswark, BS Publication.
3. Internetworking with TCP/IP by Douglas E Comer David L Stevens.

BSc 6 th Semester		Network Programming with TCP/IP Lab	
Subject Code :	16SF74/8.1	Elective	8.1
IA Marks :	10	Total Teaching Hours :	39
Exam Marks :	40	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

1. Working with system calls
2. Programs on Shell Programming using UNIX.
3. Programs on Client/Server Model
4. Programs on Socket Programming
5. Programs on IPC.

Examination:

- One Question has to be given from the above list (Carries 25 Marks)
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	10
	Execution	10	5
	Total	40	
IA - Viva/ Report		10	
Total		50	

BSc 6 th Semester		Linux Operating System	
Subject Code:	16SF74/8.2	Elective	8.2
IA Marks:	20	Total Teaching Hours:	39
Exam Marks:	80	Teaching Hours/Week:	03
Credits:	3	Examination Hours:	03

- 1. Introduction to Linux Operating System:** Features of Linux, Drawbacks of Linux, Components of Linux, Memory Management Subsystems, Linux Process and Thread Management, File Management System, Device Drivers. 8Hrs
- 2. Linux Commands and Utilities:** Entering the Machine, User Names and Groups, Logging In, Correcting Typing Mistakes, Format of Linux Commands, Changing Your Password, Characters with Special Meanings, Linux Documentation, The File System, Current Directory, Looking at the Directory Contents, Absolute and Relative Pathnames, Some Linux Directories and Files 10Hrs.
- 3. Linux Utilities and Editor:** Some Useful Commands, Permission Modes and Standard Files, Pipes, Filters and Redirection, Shell Scripts, Graphical User Interface Editor 6Hrs.
- 4. User-to-User Communication:** On-Line Communication, Off-Line Communication, Apache Server Settings, Network Server Settings, Domain Name Server, Network File Server 48 7Hrs
- 5. UNIX System Administration:** System Administration, Installing Linux, Choosing an Installation Method, Choosing an Installation Class, Pre-installation checks, Installation, Booting the System, Maintaining User Accounts, File Systems and Special Files, Backups and Restoration. 8Hrs.

Text Books:

1. Linux Kernel Programming-Monday Beck, Hochmeier, M Dziadzka
2. Internetworking with TCP/IP by Douglas E Comer David L Stevens

BSc 6 th Semester		Linux Operating System Lab	
Subject Code :	16SF74/8.2	Elective	8.2
IA Marks :	10	Total Teaching Hours :	39
Exam Marks :	40	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

1. Working with LINUX Commands.
2. Working with Pipes and Filters.
3. Working with Editors.
4. Programs on Shell Programming.
5. Programs on Networking.
6. Working with memory, file and disk related commands
7. Working with UNIX / LINUX Administration commands.

Examination:

- One Question has to be given from the above list (Carries 25 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions

Marks Distribution:

Criteria		Mark	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	10
	Execution	10	5
	Total	40	
IA - Viva/ Report		10	
Total		50	

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BSc 6 th Semester		Computer Graphics	
Subject Code :	16SF74/8.3	Elective	8.3
IA Marks :	20	Total Teaching Hours :	39
Exam Marks :	80	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

- 1. Graphics Output Primitives and Attributes:** Introduction to open GL, Coordinate reference frames, Specifying two dimensional world coordinate reference frame in Open GL, Open GL point functions, Open GL line functions, Line drawing algorithms, Circle generation algorithms, Ellipse generation algorithms, Fill area primitives, Polygon fill areas, OpenGL polygon fill area functions, General scan line polygon fill algorithm, Fill methods for areas with irregular boundaries, Open GL fill area attribute functions. 12Hrs.
- 2. Two – Dimensional and Three - Dimensional Geometric Transformations:** Basic two dimensional geometric transformations, Matrix representations and homogeneous coordinates, Inverse transformations, Two dimensional composite transformations, Other two dimensional transformations. 08Hrs
- 3. Three dimensional Translation, Rotation, Scaling, Other three dimensional transformations, Affine transformations, Open GL geometric transformation functions.** 04 Hrs
- 4. Two Dimensional Viewing.** The two dimensional viewing, Clipping window, Normalization and viewport transformations, Clipping algorithms, Two dimensional point clipping, Two dimensional line clipping algorithms, Polygon fill area clipping, Curve clipping, Text clipping. 10Hrs
- 5. Three Dimensional Viewing:** The three dimensional viewing concepts, Three dimensional viewing pipeline, Three dimensional viewing coordinate parameters, Transformation from world to viewing coordinates. 5Hrs.

Text books:

1. Donald Hearn, M.Pauline Baker, Computer Graphics with Open GL, Pearson (Indian Edition),

Reference Books:

1. Edward Angel, 'Interactive Computer Graphics' – A top down approach using Open GL, Pearson, Fifth Edition
2. Peter Shirley, Steve Marschner, Computer Graphics, Cengage Learning (Indian edition)

BSc 6 th Semester		Computer Graphics Lab	
Subject Code:	16SF74/8.3	Elective	8.3
IA Marks:	10	Total Teaching Hours:	39
Exam Marks:	40	Teaching Hours/Week:	03
Credits:	3	Examination Hours:	03

- Write a program to create a chess board using DDA line algorithm
- Write a program to implement Bresenham's line drawing algorithm with all values of slopes
- Write a program to implement Midpoint circle generation algorithm
- Write a program to create a wireframe model of globe using equation of ellipse
- Write a program to create and fill the two dimensional object by using boundary fill algorithm
- Write a program to create (without using built in function) a cube by implementing translation algorithm by translating along 1. X-axis, 2.Y-axis and 3. X and Y plane
- Write a program to create (without using built in function) and rotate (1. given an angle 2. Around x and y axis) a triangle by implementing rotation algorithm.
- Write a program to create (without using built in function) an angle by implementing scaling algorithm by zooming/un-zooming along 1. X-axis, 2.Y-axis and 3. X and Y plane
- Write a program to create (without using built in function) a cube by implementing reflection algorithm along 1. X-axis, 2.Y-axis
- Write a program to create (without using built in function) a square by implementing shear algorithm along 1. X-axis, 2.Y-axis

Examination:

- One Question has to be given from the above list (Carries 25 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	10
	Execution	10	5
	Total	40	
IA-Viva/Report		10	
Total		50	

BSc 6 th Semester		Analysis and Design of Algorithms	
Subject Code:	16SF74/8.4	Elective	8.4
IA Marks:	20	Total Teaching Hours:	39
Exam Marks:	80	Teaching Hours/Week:	03
Credits:	3	Examination Hours:	03

1. Notion of algorithm, Fundamentals of algorithmic problem solving, linear data structures, graphs, trees, sets and dictionaries.
2. Analysis of algorithm efficiency: Analysis frame-work, asymptotic notations and basic efficiency classes, mathematical analysis of non recursive and recursive algorithms, empirical analysis of algorithms.
3. Brute Force and Divide and Conquer- General method, Binary Search, Finding the maximum and minimum, merge sort, quick sort, Strassen's matrix multiplication.
4. Decrease-and-Conquer and Transform-and-Conquer: Insertion sort, depth first search, topological sorting, presorting, Gaussian elimination, balanced search trees, heap sort, Horner's rule.
5. Greedy Method: General method, optimal storage on tapes, knapsack problem, job sequencing, Minimum Cost Spanning Trees- Prim's algorithm and Kruskal's algorithm.
6. Optimal storage on tapes, optimal merge patterns, single source shortest paths, Huffman trees.

References:

1. Computer Algorithms/C++ : Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajashekar

BSc 6 th Semester		ADA Lab	
Subject Code :	16SF74/8.3	Elective	8.4
IA Marks :	10	Total Teaching Hours :	39
Exam Marks :	40	Teaching Hours/Week :	03
Credits:	3	Examination Hours :	03

1. Program for binary search (Simple and Recursive)
2. Programs for heap sort, merge sort and quick sort
3. Strassen's Matrix multiplication
4. Program for optimal merging
5. Program for Knapsack problem
6. Program for finding out cost of spanning tree by kruskal's/Prim's algorithm
7. Program for single source shortest path
8. Program for Graph coloring
9. Program to find Hamiltonian Cycle from given graph
10. Program for BFS and DFS

Examination:

- One Question has to be given from the above list (Carries 25 Marks).
- One more question has to be given by the examiner by his choice and that question need not be in the list (Carries 15 Marks).
- Student has to answer and execute both questions.

Marks Distribution:

Criteria		Marks	
		Question from The List	Examiner's Question
Practical Proper	Writing Program	15	10
	Execution	10	5
	Total	40	
IA-Viva/Report		10	
Total		50	

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