Punyashlok Ahilyadevi Holkar Solapur University, Solapur

पुण्यश्लोक अहिल्यादेवी होळकर
सोलापूर विद्यापीठ
।। विद्यया संपन्नता ।।

NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Computer Science

Name of the Course: B. Sc. Part- III (Sem. V & VI)

(Syllabus to be implemented from w.e.f. June 2021)

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

Syllabus for B.Sc. Part – III (CBCS Semester Pattern)

Computer Science (W.E.F. June 2021)

Name and Type of the Paper		Title of Paper	Hrs/Wee		Total Marks per paper	UA	CA	Credits
Type	**Name**		**L**	**P**				
B.Sc.- III Semester - V								
English (Business English)	English (Business English)		4	-	50	40	10	2.0
DSE 1 A	Paper IX	Visual Programming Using C#	4	-	100	80	20	4.0
DSE 2 A	Paper X	Core Java	4	-	100	80	20	4.0
DSE 3 A	Paper XI	Operating System	4	-	100	80	20	4.0
DSE 4 A	Paper XII	Python	4	-	100	80	20	4.0
SEC 3	Paper XIII	Linux	4	-	100	80	20	4.0
	Total (Theory)		**24**	**-**	**550**	**440**	**110**	**22.0**
B.Sc.- III Semester - VI								
English (Business English)	English (Business English)		4	-	50	40	10	2.0
DSE 1 B	Paper XIV	Web Technology	4	-	100	80	20	4.0
DSE 2 B	Paper XV	Advanced Java	4	-	100	80	20	4.0
DSE 3 B	Paper XVI	Data Communication and Networking	4	-	100	80	20	4.0
DSE 4 B	Paper XVII	Advance Python	4	-	100	80	20	4.0
SEC 4	Paper XVIII	Software Testing	4	-	100	80	20	4.0
	Total (Theory)		**24**	**-**	**550**	**440**	**110**	**22.0**
Practical								
DSE 1A &1B	Practical IV	Practical On C# and Asp.Net	-	5	100	80	20	4.0
DSE 2A &2B	Practical V	Practical on Core Java and Advanced Java	-	5	100	80	20	4.0
DSE 4A &4B	Practical VI	Practical on Python and Advance Python	-	5	100	80	20	4.0
	Practical VII	Project	-	5	100	80	20	4.0
	Total (Practical)		**-**	**20**	**400**	**320**	**80**	**16.0**
Grand Total			**48**	**20**	**1500**	**1200**	**300**	**60.0**

Note:

1. Practical IV, Practical V, Practical VI and Practical VII are as per guidelines of Science Faculty.
2. Nature of internal examination, passing standard, ATKT and the conversion of marks into grades and credits are as per guidelines of Science Faculty Credit and Grading System

Equivalence papers for B.Sc.-III Sem V and VI (Computer Science)

Sr. No	Old Paper	New Paper
B.Sc.- III Semester - V		
1	Visual Programming Using C#	Visual Programming Using C# (Sem-V)
2	Core Java	Core Java (Sem-V)
3	Operating System	Operating System (Sem-V)
4	Python	Python (Sem-V)
5	Software Testing	Software Testing (Sem-VI)
B.Sc.- III Semester - V		
6	Web Technology	Web Technology (Sem-VI)
7	Advanced Java	Advanced Java (Sem-VI)
8	Data Communication and Networking	Data Communication and Networking (Sem-VI)
9	AngularJS	**No Equivalence**
10	Linux Operating System	Linux Operating System (Sem-V)

Semester – V

Paper IX: -Visual Programming Using C#

Objectives: -

Students will try to learn:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.
5. To understand how to design GUI base windows application using C#.

Unit 1: Introduction to NET and C# (10)

Block diagram of .net framework, The Common Language Runtime, Advantages of Managed Code, A Closer Look at Intermediate Language & Assemblies-Support for Object Orientation and Interfaces, Distinct Value and Reference Types, Strong Data Typing, Garbage Collection, Compiling and Running the Program, Variables, Data Types, Flow Control, Enumerations, Namespaces-The using Statement, Namespace Aliases, The Main() Method-Multiple Main() Methods, defining & using functions & its scope, Passing Arguments to Main(), Parameter passing technique.

Unit 2: Object oriented programming in C# (10)

Classes and Structs, Class Members- Data Members, Function Members read-only Fields, properties and indexer, The Object Class-System, Object Methods, The ToString() Method

Inheritance and Polymorphism: Introduction-Types of Inheritance, Implementation Inheritance-Abstract Classes and Functions, Sealed Classes and Functions, Constructors and its types, Destructor, Interfaces-Defining and Implementing Interfaces, Derived Interfaces, Polymorphism - Method overloading, Operator overloading.

Unit 3:- Exception, Threading, Delegate and IO (15)

Exception Handling:-Try, catch, and throw, finally, Nested try, Custom exception

Threading:-Introduction- Applications with Multiple Threads, Thread Priorities, Synchronization, Life Cycle.

Delegate and Events:- Delegeates, Types of delegates- single cast, multicast and anonymous delegates, Event

IO and Collection Classes:- Stream Classes, Console I/O, File Stream and Byte-Oriented File I/O, Character based File I/O.

Unit 4:- Windows Applications (10)

Controls: Common control Group, Data control Group, Dialog control Group, Container control Group, Menus and Context Menus: Menu Strip, Toolbar Strip, SDI and MDI Applications

Outcomes:-

Students will be able to:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity using Java.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem in Java.
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Able to develop windows applications using C#.

Reference books:

1. Professional C# - Wrox Publication by Simon Robinson, Christain Nagel, Karli Watson, Jay Glynn, Morgan Skinner, Bill Evjen.
2. Inside C# - Microsoft Press by Tom Archer, Andrew Whitechapel.
3. Programming Microsoft Visual C# 2005 - The Language (Microsoft Press) by Donis Marshall

Paper X:-Core Java

Objectives:-

Students will try to learn:

1. To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
2. To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
3. Discuss the principles of inheritance, interface and packages and demonstrate though problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
4. To understand importance of Multi-threading & different exception handling mechanisms.
5. To understand how to develop GUI applications using Swing technology

Unit 1: Introduction to Java Programming (10)

Overview of Java, Features of Java as programming language /Platform, JDK Environment and Tools

Java Programming Fundaments:-Data types, Variables, Operators, Keywords, Naming Conventions, Structure of Java Program, Flow Control- Decision, Iterations, Arrays,

Unit 2: Object oriented programming in Java (10)

Class – Members access control, Objects, Constructors, Use of 'this' keyword, Static, non-static data members and methods., public, private & protected data members

Inheritance & Polymorphism-Access/Scope specifiers protected, Super, extends, single, multiple inheritance, Method overriding, Abstract classes & ADT, 'final' keyword, Extending interfaces

Unit 3: Exception Handling, Threading and Collection framework (15)

Exceptions and Types, try..catch, finally block, throw & throws statement, user-defined exceptions, Java I/O package, byte & character stream, reader & writer, file reader & writer

Threading-Java thread lifecycle, Thread class & run able interface Thread priorities & synchronization, Usage of
wait & notify

Collection framework :- Collection overview, Collection interfaces, Collection classes Vector, Array list, Hash map, Hash table, Tree map, Tree set, Hash set, Properties, Stack

Unit 4: Swing and event handling: (10)

Introduction to swing, difference between AWT and swing, hierarchy of Swing classes,

Swing controls: - JButton, JTextfield, JLabel, JCheckBox, JRadionButton, JFame, Jtable, JList, JoptionPane, JMenuitem and JMenu ,etc

Outcomes:-

Students will be able to:

1. Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity using Java.
2. Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem in Java.
3. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
4. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
5. Able to develop GUI applications using Swing technology.

Reference Books:

1. Java 2 for professional developers by Michael Morgen
2. Core Java Vol 1 and vol 2 by Cay. S. Horstmann, Gray Cornell.
3. Java by Nutshell
4. Java The complete Reference by Herbert Schildt
5. Thinking in java by Brucel

Paper XI:-Operating System

Objective:-

Students will try to learn:

1. To understand the main components of an OS & their functions.
2. To study the process management and scheduling.
3. To understand the concepts and implementation Memory management policies and virtual memory.
4. To understand the working of an OS as a resource manager, file system manager, process manager, memory manager and I/O manager and methods used to implement the different parts of OS

Unit 1: Introduction Operating System:- (10)

Definition Operating systems, Types of Operating Systems-Batch, Multiprogramming, Time-Sharing, Real-Time, Distributed, Parallel., OS Service, System components, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine

Unit 2: Process Management: - (10)

Concept of Process, Process states, Process Control Block, Context switching, Operations on Process, Co-operating Process, Threads – Types of threads, Benefits of threads.

Concept of Process Scheduling- Types of Schedulers, Scheduling criteria, Scheduling algorithms-Preemptive and Non-pre emptive , FCFS, SJF, Round Robin, Priority Scheduling, Multilevel Queu Scheduling, Multilevel- feedback Queue Scheduling.

Unit 3: Process Synchronization and Deadlocks: - (10)

The Producer Consumer Problem, Race Conditions, Critical Section Problem, Semaphores, Classical Problems of Synchronization: Reader-Writer Problem, Dinning Philosopher Problem, Critical Regions.

Definition, System Model, Dead Lock Characterization, Resource Allocation Graph, Methods of Handling Dead Locks- Deadlock Prevention, Deadlock Avoidance -banker's algorithm, resource request algorithm, Deadlock detection and Recovery.

Unit 4: Storage Management (15)

Memory Management: - Basic Hardware Address Binding, Logical and Physical address Space, Dynamic Loading, Overlays, Swapping,

Memory allocation: Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction, Paging, Segmentation. Basics of Virtual Memory, demand paging, Page fault, Page Replacement policies: Optimal (OPT), First in First Out (FIFO), Least Recently used (LRU), Thrashing.

Storage Management:- File Management: File concept, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free space management (bit vector, linked list, grouping).

Disk Management: disk structure, disk scheduling (FCFS, SSTF, SCAN, C-SCAN), disk reliability, disk formatting, boot block, bad blocks.

Outcomes:-

Students will able to:

1. Describe the important computer system resources and the role of operating system in their management policies and algorithms.
2. Understand the process management policies and scheduling of processes by CPU
3. Evaluate the requirement for process synchronization and coordination handled by operating system
4. Describe and analyze the memory management and its allocation policies.
5. Identify use and evaluate the storage management policies with respect to different storage management technologies.

Reference Books:

1. System programming and O.S. By D.M. Dhamdhere.
2. Modern O.S. By Andrews Tanenbaum.
3. Operating System Concepts By Siberchatz and Galvin.
4. Operating System(Unix) By Bach

Paper XII:-Python

Objectives:-

Students will try to learn:

1. Basics of Python programming
2. Decision Making and Functions in Python
3. Object Oriented Programming using Python
4. Files Handling in Python
5. Regular expression for pattern matching

Unit 1:- Introduction to Python: (10)

Features/Characteristics of Python, Installation and Working with Python, Structure of a Python Program, Writing simple python program, Executing python program using command line window and IDLE graphics window, Python Virtual Machine, Identifiers and Keywords, Operators (Arithmetic operators, Relational operators, Logical or Boolean operators, Assignment Operators, Bit wise operators, Membership operators, Identity operators), Operator Precedence and Associativity

Python Data Types: -Python Variables, Data types in python, Built-in Datatypes, Bool datatype , Sequences in python, Sets, Literals in python, User Defined Datatypes, Constants in python, Type conversion, Input and Output Statements, Command line arguments

Control Statements:-Conditional Statements: if, if-else, nested if –else, Looping: for, while, nested loops, Loop manipulation using pass, continue, break, assert and else suite

Unit 2:- Strings, Collection Lists, Tuples, Dictionaries, Functions and, Modules: (10)

Strings: Introduction to String, String Manipulation., Collection List: Introduction to List, Manipulating list., Tuples: Introduction to Tuples, Manipulating Tuples., Dictionaries: Concept of Dictionary, Techniques to create, update & delete dictionary items.

Functions, Modules :- Difference between a Function and a Method, Functions:- Defining a function, Calling a function, Advantages of functions, Types of functions, Function parameters:- Formal parameters, Actual parameters, Anonymous functions, Global and Local variables, Modules:- Importing module, Creating & exploring modules, Math module, Random module, Time module

Unit 3:- Object Oriented Programming (6) (15)

Features, Concept of Class & Objects, Constructor, Types of Variables, Namespaces, Types of Methods, Inner Classes, Constructors in Inheritance, Overriding Super Class Constructors and

Methods, Types of Inheritance, Abstract Classes and Interfaces, The Super() Method, Operator Overloading, Method Overloading, Method Overriding

Unit 4: Regular Expressions, Exception Handling and File (10)

Introduction to Regular Expression, Advantages & Operations, Sequence characters in Regular Expression, Powerful pattern matching and searching, Password, email, url validation using regular expression, Pattern finding programs using regular expression

Exception :- Errors in a Program, Exceptions, Exception handling, Types of Exceptions, User-defined Exceptions

Python File Operation:- Types of File, Opening and Closing a File, Reading and writing to files, Manipulating directories

Outcomes:-

Students will be able to:

1. Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Express different Decision Making statements and Functions
3. Interpret Object oriented programming in Python
4. Understand and summarize different File handling operations
5. Understand Regular expression and implement for pattern matching.

Reference Books

1. Beginning Python by Magnus Lie Hetland-Apress
2. Python Programming for the Absolute Beginner by Michael Dawson-Cengage Learning
3. Python for Everybody: Exploring Data in Python 3 by Charles Severance-CreateSpace Independent Publishing Platform
4. Introducing Python: Modern Computing in Simple Packages by Bill Lubanovic-O'Reilly Media
5. Python Programming for Beginners: An Introduction to the Python Computer by Jason Cannon- CreateSpace Independent Publishing Platform
6. Python for Beginners by Harsh Bhasin

Paper XIII:-Linux

Objectives:-

Students will try to learn:

1. To introduce Basic Linux general purpose Commands
2. To learn different editor
3. To learn shell script concepts.
4. To learn file management and permission advance commands.
5. To learn awk, grap, perl scripts.

Unit 1: Introduction of Linux:- (10)

History of Linux, Architecture of Linux system & features, Kernel, Shell & its type, Difference between Windows and Linux. Linux Distributions, Working environments: KDE, GNOME, Xface4, Hardware requirement, Installation procedure of Linux, Create partitions, Configuration of X system Users & Groups Management:- Create Users, Create groups, Special groups, Assigning permissions to users and Groups, File and Directory permissions- chmod, chown, chgrp.

Linux File System:-Hierarchy of File system, File System parts- Boot Block, Super Block, Inode Block, Data Block, File types, Devices and Drives in Linux, Mounting devices (CD/DVD, usb, hard drive partition), file system

Unit 2: Linux Command (15)

Linux commands File and directory Management Commands:-mkdir, rmdir, cd and pwd, file, ls, cat, more, less, File and Directory Operations: find, cp, mv, rm, In etc, Printing the files - lpr, lpq, lprm etc.

Filter Commands & Editor:- Filters: head, tail , pr, cut, paste, sort, uniq, tr, grep, egrep, fgrep, sed.

Communication commands:- mesg, talk, write, wall, mail.

Text Editors- vi, vim, Archive and File compression commands

Shell Programming:- Shell Variables, Meta characters, Shell Scripts – Control and Loop structure, I/O and Redirection, Piping,

Unit 3: Linux System Management (10)

Process Management: Shell process, Parent and children, Process status, System process, Multiple jobs in background and foreground, Changing process priority with nice. Listing processes, ps, kill, premature termination of process.

Disk management and System Administration:-Disk Partitioning- RAID, LVM etc., disk related Management Tools- Fdisk, Parted etc. , Boot Loaders- GRUB, LILO, Custom Loaders

Unit 4:-Linux System and Network Administration (10)

System administration – Role of system administrator, identifying administrative tasks & files, Configuration and log files, Chkconfig, Security Enhanced Linux, Installing and removing packages with rpm command

Understanding various Servers:- DHCP, DNS, Squid, Apache, Telnet, FTP, Samba.

Outcomes:-

Students will be able to:

1. Identify the basic Linux general purpose commands.
2. Apply and change the ownership and file permissions using advance Linux commands.
3. Use the awk, grep, perl scripts.
4. Implement shell scripts.
5. Apply basic of administrative task.

Reference Books :

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
2. UNIX for programmers and users by Graham Glass & King Ables, Pearson Education
3. Beginning Linux Programming by Neil Mathew & Richard Stones, Wiley Dreamtech India
4. Red Hat Linux Bible by Cristopher Negus, Wiley Dreamtech India
5. UNIX Shell Programming by Yeswant Kanethkar, BPB

Semester - VI

Paper XIV:- Web Technology

Objectives:-

Students will try to learn:

1. To understand basic of ASP.Net
2. To understand different server controls used in ASP.Net for web application.
3. To understand master page concept
4. To learn how to maintain state and security in web application.
5. To understand database connectivity with web application.

Unit 1: Introduction to ASP.Net (10)

Introduction to Web Architecture Model, Introduction to Visual Studio for Web Application, historical development of ASP.Net

Application and Page Frameworks

Application Location Options, Built-In Web Server, IIS,FTP, Web Site Requiring FrontPage, Extensions, The ASP.NET Page Life Cycle, The ASP.NET Page Structure Options, Inline Coding, New Code-Behind Pages, ASP.NET 2.0 Page Directives, @Page, @Master, @Control, @Import, @Implements, @Register, @Assembly, @PreviousPageType, @MasterType, @OutputCache, @Reference. ASP.NET Page Events, Dealing with PostBacks, Cross-Page Posting, ASP.NET Application Folders, \App_Code Folder, \App_Data Folder, \App_Themes Folder, \App_GlobalResources Folder, \App_LocalResources, \App_WebReferences, \App_Browsers, Compilation, Global.asax

Unit 2: ASP.NET Server Controls and Validation Controls (10)

ASP.Net Server Controls, Understanding Validation, Client-Side versus Server-Side, Validation, ASP.NET Validation Server Controls, Validation Causes, The Required Field Validator Server Control, The CompareValidator Server Control, The RangeValidator Server Control, The RegularExpressionValidator Server Control, The CustomValidator Server Control, The ValidationSummary Server Control, Turning Off Client-Side Validation, Using Images and Sounds for Error Notifications, Working with Validation Groups

Master Pages:- Introduction of Master Pages- The Basics of Master Pages, Coding a Master Page, Coding a Content Page, Mixing Page Types and Languages, Specifying Which Master Page to Use, Working with the Page Title, Working with Controls and Properties from the Master Page, Specifying Default Content in the Master Page, Programmatically Assigning the Master Page, Nesting Master Pages, Master Page Events, Themes and Skins

Unit 3: ASP.Net State Management, Navigation and Security (15)

Application State, Session State, Client & server storing, View state, Cache, Hidden Variable, Session object, Profiles, Overview of HTTP Handler & Modules

Site Navigation:- Site Navigation technique, SiteMap file, SiteMapPath, TreeView and MenuView control, Using XML file

ASP.NET web security:- Authentication & Authorization, Windows & forms, User.identity, User.IsInRoles, Using Data Adapter, Debugging & error Handling, ASP.Net tracing, Page Level, Application Level, Debugging, Start Debugging session, Client side debugging, Exception Handling, On page, HTTP status code,

Unit 4: ADO.Net and AJAX (10)

Data Access with ADO.NET:- ADO.NET Overview, Using Database Connections, Executing Commands, Calling Stored Procedures, Fast Data Access: The Data Reader, Data Adapter

Introduction to AJAX:- Introduction to AJAX and Need of AJAX, Server side and client side architecture ScriptManager, UpdatePanel, Timer control.

Outcomes:-

Students will be able to:

1. Understand basic of ASP.Net and web application.
2. Use different ASP.Net web server control to develop web application.
3. Use master page for interactive design
4. Maintain state and security in web application.
5. Connect any database with web application.

Reference Books:

1. Professional ASP.NET– Wrox Publication by Bill Evjen, Scott Hanselman, Farhan Muhammed, Sirnivasa Sivakumar, Devin Rader.
2. Microsoft ASP.NET Step by Step - Microsoft Press by George Shepherd.

Paper XV:- Advanced Java

Objectives:-

Students will try to learn:

1. To understand database connectivity using JDBC.
2. To learn how to develop web applications using servlet.
3. How to develop web applications using JSP.
4. To Understand concept of hibernate and struts.

Unit -1:-JDBC (10)

Introducing JDBC: Describing Components of JDBC, Features of JDBC, JDBC Architecture: Types of Divers:Advantages and disadvantages of Drives, Use of Drivers, JDBC Statement and Methods:-Statement, PreparedStatement, CallableStatement, execute(), executeQuery(), executeUpdate(), Working with Resultset interface,Working with Resultset and MetaData.

Unit -2:-Servlet (15)

Introducing CGI, Introducing Servlet, Advantages of Servlet over CGI, Features of Servlet, Introducing Servlet API, Javax.servlet package, Javax.servlet.http package, Introducing Servlet, Advantages of Servlet over CGI, Features of Servlet, Servlet life Cycle, Init(), Service(), Destroy(), Working with GenericServlet and HttpServlet, RequestDispatcher interface, Include() and forward(), Use of RequestDispatcher, Session in Servlet, Introducing session, Session tracking mechanism, Cookies, Advantages & disadvantages, use of cookies, Hidden form filed, Advantages & disadvantages, use of Hidden form filed, URL rewritten, disadvantages, use of URL rewritten, HttpSession, Advantages & disadvantages,use of URL HttpSession

Unit -3:- JSP (10)

Introduction to JSP, Advantages of JSP over Servlet, JSP architecture, JSP life cycle, Implicit objects in JSP- request, response, out, page, pageContext, application, session, config, exception, JSP tag elements- Declarative, Declaration, scriplet, expression, action., Java Bean- Advantages & Disadvantages, useBean tag- setProperty and getProperty, Bean In Jsp, JSTL core tag: General purpose tag, conditional tag, networking tag, JSTL SQL tags, Custom tag: empty tag, body content tag, iteration tag, simple tag

Unit -4:- Hibernate and Struts (10)

Introduction Hibernate(HB), Architecture of HB, Generator classes, Steps to create application of HB:- HB with annotation, Insert ,Delete,update,retrive records from database in HB, HB web application

Struts:- Introduction to struts, What is struts, Use of struts, Features of Struts, Architecture of struts, Steps to create application of struts

Outcomes:-

Students will be able to:

1. Use database connectivity using JDBC.
2. Develop web applications using servlet.
3. Develop web applications using JSP.
4. To use the concept of hibernate and struts.

Reference Books

1. Java The complete Reference by Herbert Schildt
2. Java Servlet Programming by Jasan Hunter
3. Beginning Java EE5 from Novice to Professionals by K. Makhar & C. Zelenk
4. Java Server Programming by Bayross & Shah
5. Thinking in java by Brucel

Paper XVI:-Data Communication and Networking

Objective: -

Students will try to learn:

1. Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
2. Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
3. Study Session layer design issues, Transport layer services, and protocols.
4. Study data link layer concepts, design issues, and protocols.
5. Read the fundamentals and basics of Physical layer, and will apply them in real time applications.

Unit 1. Introduction to Data Communication & Networking (10)

Data Communication: Components, Data Flow, Protocols & Standards, Design Issues of Layers, Connection oriented and connection less services, Network models :- ISO-OSI reference model, TCP/IP reference model.

Unit 2. Physical layer (10)

Signals: Analog & Digital Signals, Period, Frequency, Phase, Amplitude, Bandwidth, Bit Rate, Bit Length, Fourier analysis. Transmission Impairment: Attenuation, Distortion, Noise, Nyquiest Theorem, Shannon Capacity Theorem.

Transmission Media:-Guided Media-Magnetic Media, Twisted Pair, Coaxial Cable, Fiber Optic Cable,

Unguided Media:- Wireless- Radio Waves, Microwaves, Infrared, Satellite Communication

Digital Transmission: Manchester & Differential Manchester Coding, Pulse Code Modulation

Modulation:- Amplitude Modulation, Frequency Modulation, Phase Modulation

Transmission Mode: Parallel, Serial, Synchronous Transmission, Asynchronous Transmission.

Multiplexing- Frequency Division Multiplexing, Time Division Multiplexing, Wavelength Division Multiplexing.

Switching- Circuit Switching, Message Switching, Packet Switching.

Unit 3. Data link layer (15)

Error Detection & Correction: Types of Errors, Hamming Distance, Error Detection: Parity Check, Cyclic Redundancy Check, Checksum Check, hamming code

Data Link Control: Framing, Flow & Error Control,

Protocols: Simplex, Stop and Wait, Stop and Wait ARQ, Go Back N ARQ, Selective repeat ARQ, HDLC, Point to Point protocol.

Multiple Access Protocol: ALOHA, CSMA, CSMA/CD,

CSMA/CA Channelization, FDMA, TDMA, CDMA

Unit 4. Network layer , Transport, Session, Presentation & Application layers (10)

Network layer Design issues, Routing Algorithm: Optimality Principle, Shortest Path Routing, Distance Vector Routing, Link State Routing.

Congestion Control Algorithm: General principle of congestion control, Congestion prevention policies, Congestion Control in Virtual-Circuit Subnets, Congestion Control in Datagram Subnets

Network Devices-Hubs, Switches, Repeaters, Bridges, Routers, Gateways

Transport, Session, Presentation & Application layers (5)

TCP/IP protocol suite :- UDP,TCP,SCTP, IP, RTP, FTP, DNS, TELNET, SMTP, POP, HTTP, WWW, SNMP,ARP, RARP.

Data Compression:-Audio Compression, Video Compression

Outcomes:-

Students will able to:

1. Describe the functions of each layer in OSI and TCP/IP model.
2. Explain the functions of Application layer and Presentation layer paradigms and Protocols.
3. Describe the Session layer and Transport layer.
4. Describe the functions of data link layer and explain the protocols.
5. Explain the types of transmission media with real time applications

Reference Books:

1. Computer Networking by Tannenbaum.
2. Data communication and networking by William Stallings
3. Data communication and networking by B A Forouzan
4. Data communication and networking by Jain

Paper XVII:- Advance Python

Objective:-

Students will try to learn:

1. Windows application development in python using Tkinter.
2. MySql open source database.
3. Web application development using Django framework.
4. Concept of XML in python and network programming in Python

Unit – I:- Windows Applications using Tkinter (10)

GUI Programming GUI in Python, Advantages of GUI, Introduction to GUI library, Basic Operations using Tkinter, Root Window, Working with Containers: Frame, Canvas Layout Management, Events and Bindings, Font, Colors, drawing on Canvas (line, oval, rectangle, etc.) Widgets: Label, Button, Checkbutton, Entry, Listbox, Message, Radiobutton, Text, Spinbox, Scrollbar, Menu etc. Writing Python Programs for GUI applications

Unit – II:- Database Connectivity using MySQL (10)

Installation of MySQL Database Software, Installing MySQL Connector, Steps for Database Connectivity, Working with MySQL Database : Inserting, Retrieving, Deleting and Updating the data Working with Stored Procedure

Unit – III:- Web Application using Django (15)

What Is a Web Framework? The MVC Design Pattern, Django's History, Advantages of Django, Understanding Django environment, Installing Django, Setting Up a Database

Django architecture, The Development Server, Django Commands Overview, Starting a Project, Django apps, Difference between app and project, The Project Structure, Setting Up Your Project, Create an Application

Migration, Admin Panel. Views in Django, URL Routing, Template in Django, Models in Django, Forms in Django.

Unit – IV- XML and Networking (10)

Introduction to XML, XML Parser Architecture and API's, Parsing XML with SAX API's, Parsing XML with DOM API's

Network Programming:- Introduction to Sockets Programming, Server Socket Methods, Client Socket Methods, IP Address, URL, TCP/IP Server, TCP/IP Client, Sending E-mail Application

Outcomes:-

Students will able to:

1. Develop windows application in python using Tkinter library.
2. Basic and advance concept of MySql open source database.
3. Develop web application and web project using Django framework.
4. Understand Concept of XML in python and network programming in Python

Reference Books:

1. MySQL for Python: Database Access Made Easy- A. Lukaszewski
2. Beginning Django: Web Application Development and Deployment with Python-Daniel Rubio-Apress
3. Django Unleashed- Andrew Pinkham-SAMS
4. Practical Django Projects- James Bennett-Apress
5. Python GUI Programming with Tkinter- Alan D. Moore-Packt
6. Tkinter GUI Application Development H TSHOT - Bhaskar Chaudhary -Packt

Paper XVIII:- Software Testing

Objective:-

Students will try to learn:

1. Basic software debugging methods.
2. White box testing methods and techniques.
3. Black Box testing methods and techniques.
4. Designing test plans.
5. Different testing tools (familiar with open source tools)

Unit 1:-Introduction To Software Testing: (10)

What is Software Testing?, Use or need of software testing. ,Software Development Life Cycle (SDLC) :- Water Fall Model, Spiral Model, V- Model, Prototype Model, Hybrid Model

Unit- 2 White Box and Black Box Testing: (10)

Introduction to White box testing, Advantages and Disadvantages of White box testing, Loop Testing, Path Testing , Condition testing , Memory Testing , Performance Testing

Black Box Testing:

Introduction to black box testing , Advantages and Disadvantages of black box testing , unctional Testing- Integration Testing (Incremental Integration Testing) ,Top Down Incremental Integration Testing , Bottom Up Incremental Integration Testing , Non Incremental Integration Testing , System Testing , Acceptance Testing , Smoke Testing , Exploratory Testing , Adhoc Testing , Performance Testing – Load Testing, Stress Testing, Volume Testing, Soak Testing, Regression Testing-Unit Regression Testing/Retest, Regional Regression Testing, Full Regression Testing

Unit- 3 Test cases and its design Techniques: (15)

Introduction to Test Case , Characteristics Of Good Test Case , Test Case Template, How To Write A Test Case, How To Ensure The Test Coverage Is Good , How To Identify whether It Is a Good Test Case Or Not, Review Process/Peer Review , Preparing Review Report, Examples On Writing Test Cases, Test Cases Design Techniques-Error Guessing, Equivalence Partitioning, Boundary Value Analysis

Unit- 4 Software Test Life cycle and Defect Life Cycle: (10)

Software Test Life Cycle-Writing Test Plan, Preparing Traceability Matrix, Writing Test Execution Report, Summary Report, Retrospect Meeting /Triage Meetings, Defect Life Cycle-Concept of Defect life cycle, Difference between Bug, Defect, Failure, Error

Outcomes:-

Students will able to:

1. Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.
2. Implement various test processes for quality improvement
3. Design test planning.
4. Manage the test process
5. Use practical knowledge of a variety of ways to test software and an understanding of some of the tradeoffs between testing techniques.

Reference Books:

1. The art of Software Testing– Glenford J. Myers
2. Lessons learned in Software Testing – CemKaner, James Bach, Bret Pettichord
3. A Practitioner's Guide to Software Test Design- Lee Copeland
4. Software Testing Techniques, 2nd edition- Boris Beizer
5. How to Break Software: A Practical Guide to Testing- James Whittaker

Sample Assignments on Visual Programming

1. Write a menu driven of a] Face value b]Armstrong c]Palindrome.
2. Write a program that implement features of cross language support.
3. Write a program to overload method
4. Write a program that method should return object, Array.
5. Write a program for static class and partial class.
6. Write a program for static property.
7. Write a program for indexer.
8. Write a program to implement inheritance.
9. Write a program to overloading operator.
10. Write a program that implement interface.
11. Write a program that implement hash table.
12. Write a program that implement arraylist by using windows application.
13. Write a program that implement data structure by using windows application.
14. Write a program for delegate and event.
15. Write a program for Reading/Writing file by using byte stream class.
16. Write a program for copy one file to another file.
17. Write a program creating files & directories & display the following attribute- 1] Name 2] Size 3] Getcreationtime by using windows application.
18. Write a program for thread.
19. Design windows application which demonstrate common controls.
20. Design windows application which demonstrate Dialog group.

Sample Assignment on Java Practical

1. To find the factorial of a given number
2. To learn use of single dimensional array by defining the array dynamically.
3. To check if a number is prime or not, by taking the number as input from the keyboard
4. Write a program that show working of different functions of String and StringBufferclasss like setCharAt(), setLength(), append(), insert(), concat()and equals().
5. Write a program to create a ―distance‖ class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer
6. Modify the ―distance‖ class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.
7. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions (from lower to higher data type)
8. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword
9. Create a multi-file program where in one file a string message is taken as input from the user and the function to display the message on the screen is given in another file (make use of Scanner package in this program).
10. Write a program to create a multilevel package and creates a reusable class to generate Fibonacci series, where the function to generate Fibonacci series is given in a different file belonging to the same package.
11. Write a program ―Divide by Zero that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
12. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.
13. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).
14. Write a program to demonstrate priorities among multiple threads.
15. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).

16. Write a program to demonstrate different mouse handling events like mouseClicked(), mouseEntered(), mouseExited(), mousePressed, mouseReleased() and mouseDragged().
17. Write a program to demonstrate different keyboard handling events.
18. Write a program to demonstrate the use of push buttons.
19. Write a program to demonstrate collection classes.
20. Write a program to implement interface.

Sample Assignment on Python

1. Write a program to print strings, numbers and perform simple mathematical calculations.
2. Write a program to implement command line arguments.
3. Write a program to implements conditional statements -if, if-else, nested if.
4. Write a program to implement loops.
5. Write a program which demonstrate random module.
6. Write a program which create file and the content of file will be DNA sequence created by random module.
7. Write a program to demonstrate date related module.
8. Write a program to manipulate strings like string copy, string concatenation, string comparison, string length, string reverse etc.
9. Write program to show use of Lists and Tuples.
10. Write program which uses dictionaries
11. Write program to implement functions & Modules
12. Write program to implement Package.
13. Write a program to implement Constructors.
14. Write a program to implement types of Inheritance and Interfaces.
15. Write a program to implement Method Overloading and Method Overriding.
16. Write a program to implement Operator Overloading.
17. Write a program in to read and write contents in a file.
18. Write a program to demonstrate Exception handling
19. Write a program to demonstrate user defined exception.
20. Write a program to demonstrate the use of regular expressions

Sample Assignment on Web technology

1. Write a JavaScript for Addition, Subtraction, Division, and Multiplication of two numbers.
2. Design Webpage for employee registration form using all HTML controls and CSS.
3. Design web page for simple calculator By using class. Command name property. Button event.
4. Design web page of online shopping form which used textbox, label, buttons, and all type list controls.
5. Design Application for cross page posting.
6. Design This year calendar with all holidays in red color.
7. Design web page for image map by using Both method.
8. Design Advertisement web page.
9. Design web page which uses Multiview & View control. Wizard control. File upload control
10. Design web page for all validation control & validation Groups.
11. Create nested master pages.
12. Design web site which uses all site navigation Control.
13. Design web page which shows list of employees in selected dept.
14. Create XML & it's styles Sheet file.
15. Create Master Detail Form.
16. Create web page demonstrate insert, update, delete and select record.
17. Create web page demonstrate insert record and find sum of sal using stored procedure.
18. Design web page for grid view control.
19. Design web page which shows 10 events in calendar control.
20. Design web page which demonstrate wizard control.

Sample Assignments on Advanced Java

1. Write a java socket programming in which client sends a text and server receives it.
2. Write a program to demonstrate URL class.
3. Write a program to demonstrate InetAddress class.
4. Write a program to demonstrate use of Datagram Socket.
5. Write a program to create Student registration form using Swing Component.
6. Write the following program using Swing component. An Election is conducted between 3 candidates. There are N number of voters. By clicking Next Voter Button textboxes and RadioButtons need to be cleared. By clicking Results, the votes obtained by each candidate and the winner candidate to be displayed in text area. Exit button should exit program.
7. Write a program for inserting data into table using PreparedStatement.
8. Write a program for updating data into table using PreparedStatement.
9. Write a program for deleting data into table using PreparedStatement.
10. Write a program to demonstrate callable statement.
11. Write a Servlet program to check that life cycle methods are called by web container.
12. Write a program to create simple servlet for displaying welcome message.
13. Write a program to create servlet for session management using cookies.
14. Write a program to create servlet for session management using Hidden Form Field.
15. Write a program to create servlet for session management using URL Rewriting.
16. Write a simple program of authenticating user using filter.
17. Write a simple program to demonstrate the use of request dispatcher.
18. Write a simple program to demonstrate the use of Send Redirect.
19. Write a JSP program to count number of visitors.
20. Write a program for communication between HTML & JSP.

Sample Assignment on Advance Python

1. Write a program to draw different shapes
2. Write a program to develop GUI applications
3. Write a program to show database connectivity using MySQL to perform Insert, update and delete operations.
4. Write a program to implement Thread Synchronization.
5. Write a program to demonstrate use of XML file
6. Write a program to create simple Django app
7. Write a program to create simple Django project.
8. Write a program to create Django project which add, delete, update records.
9. Write windows application which demonstrate all layouts used in Tkinter.
10. Write windows application which demonstrate any 10 Tkinter controls.