Solapur University, Solapur

B.Sc. Part-III (Computer Science)
New CGPA pattern Syllabus
w. e. f. June-2016

Semester-V

Paper Code	Paper Name	Theory/ Practical	UA	CA	Total	Credit
VII	Visual Programming	Theory	70	30	100	3
VIII	Core Java	Theory	70	30	100	3
IX	Operating System-I	Theory	70	30	100	3
X	Data communication and networking-I	Theory	70	30	100	3
Lab-IV	Based on paper VII, IX, XI, XIII	Practical				
Lab-V	Based on paper VIII, X, XII, XIV	Practical				
Lab-VI	Project Work	Practical				
					400	12

Semester-VI

Paper Code	Paper Name	Theory/ Practical	UA	CA	Total	Credit
XI	Web technology	Theory	70	30	100	3
XII	Advanced Java	Theory	70	30	100	3
XIII	Operating System-II	Theory	70	30	100	3
XIV	Data communication and networking-II	Theory	70	30	100	3
Lab-IV	Based on paper VII, IX, XI, XIII	Practical	70	30	100	5
Lab-V	Based on paper VIII, X, XII, XIV	Practical	70	30	100	5
Lab-VI	Project Work	Practical	140	60	200	10
					800	32
					1200	32+12=44

Paper-VII
Visual Programming

Unit 1: .NET Architecture **(7)**

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

Unit 2: C# Basics **(9)**

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 3: Objects and Types **(7)**

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

Unit 4: Inheritance and Polymorphism **(9)**

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 5: Exception Handling **(4)**

Try, catch, and throw, finally, Nested try, Custom exception

Unit 6: Threading **(4)**

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

Unit 7:File I/O and Streams **(4)**

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

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-VIII
Core JAVA

Unit 1. Features of Java   **[4]**
Object Oriented Concepts, Platform Independencies, Secure over C++, Introduction to Java Environment

Unit 2. Language Fundamentals   **[4]**
Writing a simple Java program, Class concept and modularity, Data members, methods, constructor syntax, The "this" References, Static and non static data members and methods, Static block, Parameter passing in Java, Array, Garbage collection, Scope specifier's public, private and package

Unit 3. Inheritance   **[6]**
Super, Access/Scope specifiers protected, Method overriding, Abstract keyword, Final keyword, Object class and methods in Object class

Unit 4. Interfaces   **[4]**
Comparison with inheritance, Interfaces and runtime polymorphism, Wrapper classes

Unit 5. Exception handling   **[4]**
Try catch finally-flow, Throw and throws keywords, User defined exceptions

Unit 6. Multithreading   **[6]**
Concept, Life cycle of a thread, Thread class, Runnable interface, Methods in thread class-sleep, interrupt, join, priority etc., Sharing data, Synchronization, Usage of wait and notify()

Unit 7. IO programming   **[6]**
Concept, Binary and text IO, IO streams and Reader / Writers, Console I/O , Data input and data Output usage
File I/O, Object Stream and Serializable interface

Unit 8. Event Handling: **[10]**
Event Model, Event Classes, Event Listener Interfaces, Adapter and Inner Classes, Working with windows, graphics and text, using AWT controls, Layout managers and menus, handling Image, animation, sound and video, Java Applet.

Reference Books
1) "Java-2 the complete Reference" by Patrick Naughton and Herbertz Schidt.
2) "Programming with Java" by E Balaguruswamy.
3) "Computing Concepts with Java 2 Essentials", by Horstmann, JohnWiley
4) "Programming.Java", by Decker & Hirshfield, Vikas Publication.

Paper-IX
OPERATING SYSTEM - I

Unit 1: Introduction (4)

Introduction to O.S., Types of O.S. (Batch, Parallel, Multiprogramed, Time sharing, Distributed, Real Time)

Unit 2: Structure of O.S. (4)

System component, Services provided by O.S., Monolithic and Layered systems, Kernel, Shell.

Unit 3: Process Management (8)

Concepts- Process, files, System calls, Process scheduling, Operation on Process, Co-operating Process and Threads

Unit 4. Scheduling: (8)

Basic concepts, Scheduling Criteria, Scheduling Algorithm

Unit 5: Process Synchronization: (4)

Critical Section Problems, Semaphores, Critical Regions, Classic Problems of Synchronization

Unit 6: Deadlocks (8)

Definitions, Handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection and Recovery.

Unit 7: Memory Managements (8)

Background, Swapping, Continuous memory allocation, Paging, Segmentation, Virtual Memory-Demand paging, page replacement

Reference Books

1) "Operating System" By Silberschatz, Galvin and Gagne
2) "Operating System" by Bawn
3) "Modern Operating System" by Tanenbaum - PHI
4) "Operating System" by Donovan Madnick

Paper-X
Data Communication And Networking - I

Unit 1. Introduction to Data Communication & Networking   (6)

Data Communication: Internet: History of Internet, The ARPANET, NSFNET, Internet usage Architecture of the internet, Components, Data Representation, Data Flow, Communication Model.

Computer Network: Introduction of Network, Uses of a computer network, Network Criteria, Network Topologies, Types of Networks, Inter-networking, Applications of Internet.

Unit 2. Network Models   (6)

Protocols & Standards, Protocol Hierarchies, Design Issues of Layers, Services Primitives, Connection oriented and connection less services Reference Model: ISO-OSI reference model, TCP/IP reference model.

Unit 3. Physical layer   (15)

Signals: Analog & Digital Signals, Period, Frequency, Phase, Amplitude, Bandwidth, Bit Rate, Bit Length, 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

Analog Transmission: Modem, Telephone System, RS232C, 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 4. Data link layer   (12)

Data link layer Design issues,

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

Error correction, Data Link Control: Framing, Flow & Error Control, Protocols: Simplex, Stop and Wait, Stop and Wait ARQ, Go Back N ARQ, Selective repeat ARQ. Multiple Access Protocol: ALOHA, CSMA, CSMA/CD, CSMA/CA Channelization, FDMA, TDMA, CDMA

Unit 5. Network layer   (7)

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

Reference Books:
1. Computer Networking by Tannenbaum.
2. Data communication and networking by William Stallings
3. Data communication and networking by Jain

Paper-XI
Web technology

Unit 1: Introduction to ASP.Net (4)

Introduction & diff. between ASP & ASP.Net 1.1 & 2.0 Application, Web Architecture Model, Introduction to Visual Studio for Web Application

Unit 2: Application and Page Frameworks (10)

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 3: ASP.NET Server Controls and Validation Controls (9)

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

Unit4: Working with Master Pages (7)

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 5: ASP.Net State Management (6)

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

Unit 6: Data Access with ADO.NET (8)

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

Reference Books:

1. Professional ASP.NET 2.0 – Wrox Publication by Bill Evjen, Scott Hanselman, Farhan Muhammed, Sirnivasa Sivakumar, Devin Rader.
2. Microsoft ASP.NET 2.0 Step by Step - Microsoft Press by George Shepherd.

Paper-XII
Advanced Java

Unit 1 Introduction to Swing Technology **(4)**

JApplet, JFrame and JComponent, Icons and Labels, Handling Threading issues, Text fields, Buttons - The JButton class, Check Boxes, Radio buttons, Combo boxes, Tabbed panes, Scroll panes, Tree, Table.

Unit 2. Working with databases: **(6)**

Connecting to databases, Driver types, Handling Exceptions, Creating and Using Statement Objects, Using Statements to Insert, Update, Delete Data into a Database, Using the ResultSet Class, Data navigation, Prepared Statements, Callable Statements

Unit 3. <u>Servlets</u> **(10)**

HTTP and Server Programs, Request Methods, The Servlets Model and HTTPServlets- Basic Servlet Design, A Servlet That Responds to POST Requests, The Request Object, The Response Object, Deployment Descriptors, Servlet Lifecycle, Event Logging in Servlets, Multithreading in Servlets, Session Management- Creating and Using Session, Using Cookies in Place of Sessions, Filter- Implementing the Filter Interface, Modifying the Deployment Descriptor to Use a Filter, The MVC Architecture

Unit 4. JavaServer Pages **(12)**

Introduction to JSP- JSP Development, Basic JSP Lifecycle, JSP Elements, Creating and Deploying a JSP Web Application, Using Implicit Objects- The Request Object, The Response Object, The Out Object-The Session Object, The config Object, The Exception Object, The Application Object, Using Standard Actions and Implicit Objects in JSP Pages, Translation and Compilation, Handling Error and Exceptions-Dealing with Exceptions through the Page Directive, Dealing with Exceptions in the Deployment Descriptor, Adding Exception Handling in JSP Pages, Including and Forwarding from JSP Pages- Expression Language, Custom Actions and Tag Handlers

JSP Standard Tag Library (JSTL)

Unit 5. EJB Fundamentals and Session Beans **(12)**

Understanding EJBs, The Three kinds of EJBs, The Anatomy of a session Bean, Developing Session Beans, How entity Beans works with Session Beans, The Anatomy of an Entity Bean, The Entity Bean Class, Container-Managed Persistence, The entity manager Interface-Primary keys, Bean Manage Persistence, Developing CMP Entity Beans, Developing BMP Entity Beans, The EJB Query Language, EJB SQL Queries, Building and Deploying the EJB QL Queries

References

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-XIII
OPERATING SYSTEM - II

Unit 1. Linux Operating System: **(6)**

History of Linux & Unix, Features of Linux, Shell: Bourne, Korn & c-shell, File Structure: Directories & files, Utilities: editors, filters & Communications.

Unit 2. Installing Linux: **(4)**

Creating a Linux Partition, Creating install disk, Creating boot disks for LINUX & Installing LINUX, network Configuration, final configuration, installing LILO, installing & configuring X- windows.

Unit 3. Shell operations: **(6)**

The command Line, Standard I/O and Redirection, Pipes, Shell Variables, Shell Scripts, User Defined Commands, Jobs: Background, Kill and Interruption, Delayed Execution.

Unit 4. Linux File Structure: **(8)**

Linux Files, File types, File Classification: the file & od commands. The file structure, home directories, path names, system directories, listing, displaying & printing files, ls, cat, more and lpr commands.Managing directories: mkdir, cd and pwd. Nested directories, file and directories operations: find cp, mv, rm, ln

Unit 5. File management operations: **10**

Displaying file information: ls with its all options, file directories permission: chmod, Setting permissions: permission symbols, chown and chgrp, mounting and formatting floppy disks, mounting cd-roms, mounting head drives partitions Linux and ms-dos. The fstab file: lisa and fstool, nfs and /etc/exports, NIS, archive files and devices: tar, Xtar, file compression : gzip, installing software from compressed archive: .tar.gz, downloading, compressed archive, compiling software, the mtools utilities: msdos, dos and windows emulators, dosemu, wine and willow.

Unit 6. To study vi editor: **(4)**

Create a file, Edit Text, Moving around. Save the file. customizing ex/vi, options to vi, splitting a file using split command. (Study all important commands & key combinations)

Unit 7. Filters: **(5)**

Simple Filters: pr, head, tail, cut, paste, sort, uniq, nl & kill commands. Line editing with ex command, Logging out. Advanced Filters: Single Quotes & Double Quotes, the grep command. Stream editing with sed command Translating characters-the tr command. Relational join: The join command

Unit 8. Shell Programming : **(2)**

Shell programming basic, programming constructs.

References

1. UNIX Systems V.4 Concepts & Applications By Sumitabha Das (TMH)
2. Using Linux by Bill Ball (Que-PHI)
3. Red Hat Linux: the complete reference by peterson

Paper-XIV
Data Communication and Networking - II

Unit 1: Transport, Session, Presentation & Application layers (10)
Elements of Transport Protocols-Addressing, Connection establishment, Connection Release, Flow Control & Buffering, TCP/IP protocol suite-Transmission Control Protocol, User Datagram Protocol, IP, Real Time Transport Protocol, FTP, DNS, TelNet, SMTP, POP, HTTP, WWW, SNMP, ARP, RARP etc., Data Compression-Audio Compression, Video Compression

Unit 2. Network Security (10)
Introduction about Network security, Security Techniques- Encryption & decryption, Digital Signatures, Cryptography, Firewall

Security Services, Authentication Mechanisms– Passwords, Smart Card, Biometrics.

Unit 3. Network Devices & Services (10)
Network Devices-Hubs, Switches, Repeaters, Bridges, Routers, Gateways

Network Services-VPN, Virtual LAN, Wi-Fi Network, Remote Sensing, GPS GPRS, GSM, Bluetooth, Video Conferencing.

Unit 4. Web Security (8)
SSL Encryption, TLS, SET, E-mail Security, PGPs / MIME, IP Security.

Unit 5. CASE study: Linux (6)
Installing client & server, Roles & responsibility of Network Administrator Server Management-Login Script, Ftp Server, News & search server, Web Server, Samba Server, Mail Server, Proxy Server, Print Server, User & group management

References Books :
1. Computer Networking by Tannenbaum.
2. Network Security Essentials by William Stallings
3. Dorothy E. Denning, "Cryptography and Data Security", Addison-Wesley
4. Data communication and networking by William Stallings
5. Complete Reference Red Hat Enterprise Linux & Fedora Edition by Petersen Haddan

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
   - 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
   - Multi-view & 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.

Assignments on Core Java and Advanced Java

1. Write a program to check whether given number is prime or not.
2. Write a program to sort an array.
3. Write a program to find area of rectangle by using multiple classes.
4. Write a program for matrix operations like :--
   a) Addition   b) Subtraction   c) Multiplication.
5. Write a program for use of command line argument.
6. Write a program to check parameter passing technique in Java.
7. WAP to overload constructor.
8. WAP which uses objects as a parameter.
9. WAP which uses function return object.
10. Write a program for method overloading & overriding.
11. Write a program for that will demonstrate use of final, Finalize & finally.
12. Write a program on multilevel inheritance.
13. Write a program for which demonstrates use of dynamic method dispatch technique.
14 WAP to create multithreading program by using object of thread class.
15 WAP on thread priorities.
16 WAP to read the file student's result & compute & print total & percentage.
17 Write an applet to make simple applet and print hello message.
18 Write a applet to draw following shapes
        a)Cone.   b) Cylinder.   c) Cube.   d) Square.

Assignment 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 that implements the fallowing string operations-
   a] substring   b] split   c] replace   d] insert   e] padleft.
4. Write a program to overload method.
5. Write a program that method should return object, Array.
6. Write a program for destructor.
7. Write a program for static constructor.
8. Write a program for static class.
9. Write a program for partial class.
10. Write a program for static property.
11. Write a program for indexer.
12. Write a program to implement inheritance.
13. Write a program on nesting of a namespace.
14. Write a program to overloading operator.
15. Write a program that implement interface.
16. Write a program for Reading/Writing file by using byte stream class.
17. Write a program for copy one file to another file.
18. Write a program for Random file
19. Write a program for thread.

Assignment on Data Communication and Network – I and II

1. A program that prints the address of Specific Computer.
2. A program that prints the address of Specific IP Address.
3. A program that prints all the addresses of workgroup.
4. Given the address, find the hostname
5. Get a socket's information
6. Look for ports with socket closing
7. Look for local ports
8. Construct a Datagram Packet to receive data
9. Look for local UDP ports
10. Download a web page with a URLConnection
11. Sending a very simple mail message
12. A graphical SMTP client
13. An applet that sends email
14. A protocol-independent mail client
15. A program to read mail headers
16. A program to read mailbox flags
17. A program to read mail attributes
18. Sharing computer resources as Printers, CD-ROM Drivers and Fax Machines etc.
19. Mapping Network Drive.
20. File transfer from one client to other.
21. Configuration of Internet by using Dial Up Connection & Broad Band Connection.

Assignment on Operating System – I and II

1. Write a shell program to generate following series. 1,3,2,4,3,5,4,6,5,..............50.
2. Write a shell program to check entered file mode.
3. Write a menu driven shell program
   - List of file
   - Process of user
   - Today's date

4. Write a shell program to find Armstrong nos. between 1 to 200

5. Write a shell program to check given number is Magic number. 6.Write a menu driven shell program
   - Change the owner of a file
   - Set permission read , write , execute to a file
6. Write a shell program to find Palindrome nos. between 1 to 500.
7. .Write a shell program to check given number is perfect or not.
8. Write a menu driven shell program
   - To locate all files named by bsc
   - User of system
   - Merge two files
9. Write a shell program to display Fibonacci series from 1 to 40.
10. Write a program to display face value given number.
11. Write a menu driven shell program
    - To create hard link a file bsc to bcs file
    - Cut fields 2 & 3 from a bsc file
    - Create a new file
12. Write a shell program to display sum of the digits.

13. Write a shell program to check given number is prime or not.
14. Write a menu driven shell program
    - To remove the repeated line from the file.
    - Remove the execute permission of a file
    - Change the group name of a file.
15. Write a shell program to reverse the given no.

16. Write a shell program to find out maximum no.
17. Write a menu driven shell program

- To find out Factorial.

- To find out given no is perfect or not.

- To find out Armstrong or not.

18. Write a shell program to find out given no is Even or Odd.
19. Write a shell program to find out given year is leap year or not.

Project Work

The project work and comprehensive viva will be evaluated for 200 (UA140+CA60) marks for the examination conducted by the University. Maximum two students will be allowed in one project group.

Nature of Practical Examination

1. No. of sections: 02
2. Each section contains 02 questions
3. Each question carries 30 marks
4. Attempt one question from each section   : 60 marks
5. Viva   : 10 marks
6. Internal (CA)   : 30 marks

   Total marks   : **100 marks**