SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED [M.S.]

Choice Based Credit System
(CBCS Pattern)
Faculty of Science and Technology
Syllabus of B.Sc. Second Year
Effective from Academic Year (2017-2018)
Under Graduate (UG) Program

Subject : **Computer Science**

Semester Pattern	**Core Course Code Section**	**Paper No. & Title**	**Periods/ Week**	**Marks for**		**Total Credits (Marks)**
				External: ESE TH+MCQ [30+10]	**Internal: CA & SEC**	
Semester-III	**CCCS-III Section-A**	**Theory Paper No.VI** Operating System	03	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	CCCS-III Section-B	**Theory Paper No.VII** Programming in C++	03	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	CCCSP-II Section-A	**Paper No. X Laboratory Course Work (LCW)-II:** Practical's based on theory papers-**VI & VII (OS and C++)**	04	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	SECCS-I	**Paper No. XI Skill Enhancement Course-I: A) Programming in SCILAB-I OR B) PC Installation & Networking**	03	**Marks: 25**	**Marks: 25**	Credits: 02 (Marks:50)
Semester-IV	**CCCS-IV Section-A**	**Theory Paper No. VIII** Computer Network	03	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	CCCS-IV Section-B	**Theory Paper No. IX** Programming in JAVA	03	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	CCCSP-III Section-B	**Paper No.XII Laboratory Course Work (LCW)-III:** Practical's based on theory papers-**VIII & IX (CN & Java)**	04	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	SECCS-II	**Paper No. XIII Skill Enhancement Course-II: A) Web Applications OR B) Digital Media**	03	**Marks: 25**	**Marks: 25**	Credits: 02 (Marks:50)
Total				**ESE Marks:290**	**SEC+CA Marks:50 +60=110**	**Credits:16 Marks:400**

(**CCC:** Core Course Computer, **CCCP:** Core Course Computer Practical**, LCW:** Laboratory Course Work, **ESE:** End of semester examination, **CA:** Continuous assessment, **SEC:** Skill Enhancement Course)

Note: The size of the practical group/batch for practical papers is recommended to be 10-15 students as per the UGC Guidelines Under CBCS (Choice Based Credit System) -May 2015.

Paper VI: Operating System

Unit I: Overview of Operating System

Introduction, What Operating Systems Do, Computer-System Organization, Computer-System Architecture, Special-Purpose Systems, Operating-System Structure, Operating-System Operations, Process Management, Memory Management, Storage Management, Protection and Security, Distributed Systems, Special-Purpose Systems, Computing Environments

Unit II: Exploring Operating System

Operating-System Services, User Operating-System Interface, System Calls, Types of System Calls, System Programs, Operating-System Design and Implementation, Operating-System Structure, Virtual Machines, Operating-System Generation, System Boot

Unit III: Process & Threads

Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication, Examples of IPC Systems, Communication in Client- Server Systems, Overview of threads, Multithreading Models

Unit IV: Memory

Background, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, virtual memory

Unit V: File System

File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing, Protection, File-System Structure

Unit VI: Protection in Operating System

Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of Access Control, Revocation of Access Rights, Capability-Based Systems, Language-Based Protection

Text/Reference Books:

1. A SILBERSCHATZ, et.al. “Operating System Concepts”, John Wiley & Sons.
2. A Tanenbaum “”Modern Operating Systems”, PHI Publication
3. William Stallings “Operating Systems”, Prentice Hall

Online References:

1. www.os-book,com

Paper No: VII : Object Oriented Programming using C++

Unit I: Object Oriented Programming & C++

Object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object Oriented Languages, Applications of OOP, A Simple C++ Program, More C++ Statements, Structure of C++ program.

Unit II: Basics of C++

Introduction, Tokens, Keywords, Identifiers & Constants, Basic Data Types, User-defined Data Types, Derived Data Types, Variables : declaration & dynamic initialization, Reference variables, Operators in C++ : Scope Resolution, Manipulators, Operator Precedence,

Decision Control & Loop Control Structures: If, If-else, Nested If, Else-if ladder, switch, go-to, break statement, while, do-while, for.

Unit III: Functions in C++

Introduction, Function Prototyping, Call by Value & Call by reference, inline function, default arguments, Function Overloading, Library Functions

Unit IV: Classes & Constructors in C++

Introduction, Structures, Specifying a Class, Defining member functions, Memory allocation for objects, Static Data Members, Static Member Functions, Objects as Function arguments, Friend Functions.

Introduction to Constructors, Parameterized Constructors, Copy Constructors, Multiple Constructors in a class, destructors.

Unit V: Operator Overloading

Introduction, Defining Operator overloading, Overloading Unary Operators, Overloading binary operators, overloading binary operator using friend, Rules for overloading operators

Unit VI: Inheritance in C++

Introduction, defining derived classes, single inheritance, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, Abstract classes.

Text/Reference Books:-

1. Object-Oriented Programming with C++ -E-Balgurusamy
2. The C++ Complete Reference -TMH Publication
3. Object Oriented Programming in C++ by Robert Lafore

Online References:

1. www.spoken-tutorial.org free online course of C++

Paper VIII: Computer Network

Unit I : Introduction to Network

Definition & Applications of Computer Network, Data Transmission Modes, Protocol Hierarchies, Design issues for layers, Connection Oriented & Connectionless services. Service Primitives. Network Models – OSI/ISO Reference Model & TCP/IP Model,

Unit II : Network Hardware

Network Topologies, Network Devices - NIC Cards, Hub, Switch, Bridges, Wireless access points, Router, Gateways, Modems, ISDN Terminal Adaptor, Repeaters, Types of Networks

Unit III : Transmission Media

Magnetic Media, Twisted pair, Co-axial cable , fibre optics , radio transmission, Wireless transmission, Bluetooth.

Unit IV : Telephone System

Structure of telephone system, Transmission & Switching, Trunks & Multiplexing ,Type of Switching, Introduction to mobile telephone system.

Unit V : Internetworking protocols

Network Protocols, Email Architecture, Web server, Browsers, Domain Name System, IP protocol, IP addresses , IPv6. Introduction to Wi-Fi & 4G technology.

Unit VI : Network Security & Cryptography

Introduction to Security & Cryptography, Security concepts- Computer Security, Network Security, Information Security, Firewall, Working of Firewalls, Conventional Cryptography, Caesar's Cipher, public key Cryptography.

Text/Reference Books:

1. Computer Networks By Andrew S Tanenbaum (PHI) 4th edition
2. Computer Networking & Internet by Fred Halsall, Addison Wesley
3. Computer Networks – A Systems approach by Peterson MK Publishers

Online References:

1. www.nptel.ac.in: Free Online course on Computer Networks

Paper No: IX: Programming in Java

Unit I : Java Evolution.

Java History, Java Features, How java differs From C and C++, Java and Internet. Java & WWW, Web Browsers, Java support systems, Java Environment

Unit II : Overview of Java

Introduction, simple java program, More JAVA Statements, An application with two classes, Java program structure, implementation of a java program, JAVA Virtual Machine, Command Line Arguments

Java Tokens , Constants, Variables, Data Types, Declaration of variable, Giving Values to variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of variables, Standard Default values, Java Statements

Unit III : Classes, Object and Methods

Introduction, Defining a class, Adding variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors. Method Overloading, Static Members, Nesting of Method, Inheritance: Extending a class, Overriding Method, Final variable and Methods.

Unit IV : Interfaces - Multiple Inheritances

Introduction, Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variables

Unit V : Arrays and Strings

Introduction, One-dimensional Arrays, Creating an one dimensional array, Two dimensional Arrays, Creating an two dimensional array, String Arrays, String Method

Unit VI : Packages and Applets

Introduction, Java API package, Using system packages, Naming Conventions, Creating Packages, Accessing a package, Using a Package, Adding a class to a package.

Introduction, how applets differ from applications, preparing to write applets, building applet code, applet life cycle

Text/Reference Books :

1. Programming with Java - A primer-By E. Balagurusamy (Tata Me Graw Hill)
2. Java 2 Complete Reference
3. Java How to program by Deitel

Online References:

1. www.spoken-tutorial.com : Free Online course of JAVA

Paper No: X : Computer Lab-2

Laboratory Course Work (LCW)-II:

Practical's based on theory papers-**VII & IX (OS & C++)**

At least 20 (10 from each paper) practical exercises based on following guidelines:

1. Introduction to Linux

2. Linux Installation;

3. Simple Linux Commands:

alias, at, banner, cat, cd, chmod, chown, chroot, cp, dd, grep, gzip, gunzip, kill, ln, ls, mail, man, mcopy, mdel, mdir, more, ps, pwd, rm, rmdir, shutdown, sort, su, tar, unzip, vi, wc, who, whoami, zip.

4. Communication Commands:

write, wall, talk, mesg, motd.

5. Administration Commands:

adduser, cpio, fdformat, halt, hostname, ifconfig, login, logout, lpc, lpd, lprm, mount, mv, passwd, ping, quota, route, umount.

6. Shell Scripting;

7. Shell Programs.

C++ Practical List

1. Simple C++ Programs
2. Program in C++ using decision control structures
3. Program in C++ using looping statements
4. Program in C++ using Switch Statement
5. Program in C++ using functions
6. Program in C++ using a function with default arguments
7. Program in C++ using a class and member function defined outside the class
8. Program in C++ using Multiple Constructors in a class
9. Program in C++ using Object as function arguments
10. Program in C++ using Operator overloading
11. Program in C++ to Overload Unary Minus (-) Operator
12. Program in C++ to demonstrate Different types of Inheritance

13. Program in C++ to demonstrate Multiple Inheritance
14. Program in C++ to demonstrate Single Inheritance
15. Program in C++ using Static Data Members
16. Program in C++ to Demonstrate Use of File

Text/Reference Books:

1.Unix concepts and applications by Sumitabha Das McGraw Hill Education; 4 edition

2. UNIX: The Complete Reference, Second Edition McGraw Hill Education; 2 edition

3. The Unix Programming Environment by karnighan and Pike Pearson Education India; 1 edition

Paper No. XI - Skill Enhancement Course-I:

XI (A) Programming in SCILAB-I (Begineer)

Unit I
Why Scilab, Capabilities of Scilab package, benefits of shifting to scilab
Unit II
Installing
Show where to download from and how to decide which version to choose (OS and 32/64bit) (www.scilab.org/download)
Windows installation (Internet Connection is necessary)
Linux installation (using package manager- show only Debian/Ubuntu as example (sudo apt-get install scilab) as well as generic binary
Unit III
Getting Started
Expressions: Show mathematical expressions with numbers, Variables, Diary command, Define symbolic constants, Basic functions, suppressing output(;), help, clc
Unit IV :
Vector Operations
Define vector, Calculate length of a vector, Perform mathematical operations on Vectors such as addition, subtraction and multiplication, Define a matrix, Calculate size of a matrix, Perform mathematical operations on Matrices such as addition, subtraction and multiplication
Unit V:
Matrix Operations
Access the elements of Matrix, Determine the determinant, inverse and eigen values of a matrix, Define special matrices, Perform elementary row operations, Solve the system of linear equations
Unit VI:

Conditional Branching
'if' and 'then' with the example, use of the 'else' keyword, use of the 'elseif' keyword, example for select

Text/References Books:

1. Engineering & Scientific Computing with MATLAB by C. Gomez
2. SCILAB by A.S. Nair

Online References:

1. www.spoken-tutorial.org

Paper No. XI - Skill Enhancement Course-I:
XI (B) PC Installation & Networking

Course Objective :

The course is designed to build practical skills in Assembling & maintenance of the personal desktop computer, installation of operating system and software's as well as to setup the network. The classes focus on workshops where students learn and apply these skills.

Unit I :

Study of computer devices : Keyboard, Mouse, Monitor, RAM, Hard Disk, CD Drive, Motherboard, SMPS, Pen Drive

Unit II :

Installation of Windows OS on a Computer

Unit III:

Windows OS Administration: Creating User, Installing/Uninstalling programs, copy files & folders, Creating a CD, Formatting Pen Drives,

Unit IV:

Installing printer, Connecting to LAN, Using Printer in LAN, Sharing Files on LAN

Unit V:

Connecting to Internet, Browsing web sites, creating an E-mail account, Downloading contents from Internet

Unit VI:

Using System Tools : diskcleanup, diskdefragmentation, Antivirus Software

Text/References Books:

1. Computer Installation & Servicing by D Balsubrmaniyam, McGraw Hill Pub.

2. PC : Repair & Maintenance a practical guide by J Rosenthal, K Irwin

3. Easy PC Maintainance & Repair by Philip Laplante, McGraw Hill Pub.

Online References:

1. www.nsdcindia.org official web site of National Skill Development Corporation

Paper No: XII : Computer Lab-3

Laboratory Course Work (LCW)-III:

(CN & Java)

1. Network Setup
2. Configuring IP Addresses
3. Simple JAVA Programs
4. JAVA Programs using control structures
5. Program in JAVA using Two classes
6. Program in JAVA to demonstrate Command Line Arguments
7. Program in JAVA to demonstrate Method Overloading
8. Program in JAVA using Inheritance
9. Program in JAVA to Demonstrate Method Overriding
10. Program in JAVA using Interface
11. Program in JAVA using an Array
12. Program in JAVA to demonstrate String Methods
13. Program in JAVA using user Package
14. Program in JAVA using system package
15 Program in JAVA using constructors
16. Program in JAVA using Nesting of Methods

Paper No : XIII
Skill Enhancement Course-II:
XIII(A) Web Site Designing using Google Sites

Course Objective :

The course is designed to build practical skills of development of web applications

Unit I
What is Web?, Internet, What is mean by web site?
Unit II
Create a site, Change your Sites Appearance, Change your Site's Layout, Create a Page, Create and Edit Page Templates
Unit III
Add text, images, or links, Create custom page layouts or gadgets, Add a Google Group on your website, Use scripts to do tasks on your site,
Unit IV
Attach files from your computer, Link to files or text within your site, Insert calendars, maps, Google Drive files and gadgets
Unit V
Share your site with other people, Change your site's homepage and search, Comment on a page
Unit VI
Track visitors to your site, Delete or move a page, Delete or restore your site, Keyboard shortcuts for Google Sites, Use Google Sites with a screen reader, Report abuse and illegal activity

Text/Reference Books:
1. Google sites & Chrome for Dummies by R Teeter & K Barksdale,
Online references:
1. www.sites.google.com

Paper No : XIII
Skill Enhancement Course-II:

XIII (B) Digital Media

Course Objective :

The course is designed to build practical skills in the creation and publication of digital technologies. The classes focus on workshops where students learn and apply these skills.

Unit I

Presentation Softwares : Introduction to power point , Creating Presentation with power point, Introduction to Flash , Creating Presentation with flash

Unit II

Blogging : Fundaments of blog, Common examples of Blog, Create a blog with multi-media content

Unit III

Digital photography : Basics of Digital Photography, Camera and shooting, Digital image editing , Digital image management

Unit IV

Podcast : Fundaments of Podcast, Audio recording and editing , Publishing and hosting podcast

Unit V

Promoting the Blogs : Social Media tools, Writing content for the web, Search engine optimisation

Unit VI

Copyrights : Towards Fair-use; Public domain; Digital commons, copyright in India- A overview

Text/References Books:

1. Digital Photography for dummies by Julie A King

2. Learning to use Powerpoint by A Bassant

3. Podcasting by Steve Shipside