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: **Information Technology (Optional)**

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	CCIT-III Section-A	**Theory Paper No.VI** Operating System	03	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	CCIT-III Section-B	**Theory Paper No.VII** Programming in JAVA	03	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	CCITP-II Section-A	**Paper No. X Laboratory Course Work (LCW)-II:** Practical's based on theory papers-**VI & VII (OS and Java)**	04	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	SECIT-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	CCIT-IV Section-A	**Theory Paper No. VIII** Computer Network	03	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	CCIT-IV Section-B	**Theory Paper No. IX** Programming in Python	03	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	CCITP-III Section-B	**Paper No.XII Laboratory Course Work (LCW)-III:** Practical's based on theory papers-**VIII & IX (CN & Python)**	04	**Marks:** 40	**Marks:** 10	Credits: 02 (Marks:50)
	SECIT-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: 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 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 IX: Programming in Python

Unit I: Introduction to Python • The basic elements of python • Branching Programs • Control Structures • Strings and Input • Iteration

Unit II: Functions, Scoping and Abstraction • Functions and scoping • Specifications • Recursion • Global variables • Modules • Files • System Functions and Parameters

Unit III: Structured Types, Mutability and Higher-Order Functions • Strings, Tuples, Lists and Dictionaries • Lists and Mutability • Functions as Objects

Unit IV: Testing, Debugging, Exceptions and Assertions • Types of testing – Black-box and Glass-box • Debugging • Handling Exceptions, Assertions

Unit V: Classes and Object-Oriented Programming • Abstract Data Types and Classes • Inheritance • Encapsulation and Information Hiding

Unit VI: Simple Algorithms and Data structures • Search Algorithms • Sorting Algorithms • Hash Tables

Text/Reference Books:

1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
2. R. Nageswara Rao, "Core Python Programming", dreamtech
3. Wesley J. Chun. "Core Python Programming - Second Edition", Prentice Hall
4. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Pyhon", Wiley
5. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication
6. Luke Sneeringer, "Professional Python", Wrox

Paper No: IX: Programming in Python

Paper No: X : Computer Lab-2

Laboratory Course Work (LCW)-II:

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

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.

Java Practical List(guidelines)

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

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 & Python)

List of experiments for Computer networks course

1. PC to PC Communication
2. Parallel Communication using 8 bit parallel cable
3. Serial communication using RS 232C
4. Ethernet LAN protocol
5. To create scenario and study the performance of CSMA/CD protocol through simulation
6. Token bus and token ring protocols
7. To create scenario and study the performance of token bus and token ring protocols through simulation
8. Wireless LAN protocols
9. To create scenario and study the performance of network with CSMA / CA protocol and compare with CSMA/CD protocols.
10. Implementation and study of stop and wait protocol
11. Implementation and study of Goback-N and selective repeat protocols
12. Implementation of distance vector routing algorithm
13. Implementation of Link state routing algorithm
14. Implementation of Data encryption and decryption
15. Transfer of files from PC to PC using Windows / Unix socket processing

List of Experiments with Python:

1. Develop programs to understand the control structures of python
2. Develop programs to learn different types of structures (list, dictionary, tuples) in python
3. Develop programs to learn concept of functions scoping, recursion and list mutability.
4. Develop programs to understand working of exception handling and assertions.
5. Develop programs for data structure algorithms using python – searching, sorting and hash tables.
6. Develop programs to learn regular expressions using python.
7. Develop chat room application using multithreading.
8. Learn to plot different types of graphs using PyPlot.
9. Implement classical ciphers using python.
10. Draw graphics using Turtle.
11. Develop programs to learn GUI programming using Tkinter.

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