Shivaji University, Kolhapur.

Syllabus of the B.Sc. Part - II I.T. Semester III & IV to be implemented from the academic year 2011-12 onwards.

Course structure for B.Sc. Part-II I.T.

Subjects	Name of the Paper		**Marks**		
			Theory	Internal	Practical
B.Sc. Part II: IT Semester-III	11.1	Object Oriented Programming Part-I	40	10	---
	12.1	Computer Graphics Part-I	40	10	---
	13.1	Software Engineering	40	10	---
	14.1	Linux Operating System Part-I	40	10	---
	15.1	Microprocessor 8085	40	10	---
	16.1	Discrete Mathematics and Linear Algebra	40	10	---
B.Sc. Part II: IT Semester-IV	11.2	Object Oriented Programming Part-II	40	10	---
	12.2	Computer Graphics Part-II	40	10	---
	13.2	RDBMS	40	10	---
	14.2	Linux Operating System Part-II	40	10	---
	15.2	Microcontroller 8051	40	10	---
	16.2	Operations Research	40	10	---

B.Sc. Part II: IT **Lab Course**	Lab Course Based on Paper 11.1, 12.1, 11.2 and paper 12.2	--------	---------	100
	Lab Course Based on Paper 13.1 14.1, 13,2 and 14.2	--------	---------	100
	Lab Course Based on Paper 15.1 15.2,	--------	--------	100
	Lab course –VIII Project & Viva	--------	--------	100

4 hours practical per batch of 20 students

Semester- III

Paper Number : 11.1
Paper Title : Object Oriented Programming Part-I

Unit -1 Object Oriented Concepts **5**
1. Difference between object oriented and procedure oriented programming
2. The object oriented approach.
3. Object oriented design.
4. Concept Of OOP-Data abstraction, Encapsulation, Inheritance, Polymorphism.

Unit - 2 Introduction To C++ **10**
1. Introduction.
2. Terminology-Tokens, Keywords, Identifiers.
3. Structure of C++,
4. Operators.
a)Dynamic Memory allocation (New and Delete),This pointer.
b)Dynamic initialization of variable, reference variables
5. Input & output Streams.
6. Basic data Types.
7. Simple programs.

Unit - 3 Classes and Objects **15**
1. Concept of class and object.
2. Simple Class.
3. Member functions.
4. Private, Public & protected members.
5. Array of objects.
6. Nested class.
7. Passing Object as a parameter.
8. Inline function, reference arguments.

Unit -4 Constructor and Destructor **10**
1. Introduction of Constructor And Destructor
2. Default constructor, Copy constructor, Parameterised constructor.
3. Multiple Constructor in class
4. Friend function.

Reference Books-

(For Unit 1 to 7)
1. Object oriented programming By E. Balagurusamy.
2. Mastering C++ -By Venugopal.
3. C++ Programming –By D. Ravichandran
4. Let Us C++ By Yashawant Kanetkar.
5. Object Oriented Programming in C++ - Dr. G. T. Thampi, Dr. S. S. Mantha

Computer Lab Practical

1. Write a program to generate fibonnacies Series.
2. Write an object program in C++ to read a set of nos. up to n where n is defined by the programmer and print the content of the array in sorted order.
3. Write a Object orienting program in c++ which to store and display the information of employee.

Paper-12.1 Computer Graphics Part-I

1. Introduction to Computer Graphics: Computer Graphics overview, Types of graphics devices, Storage tube display, calligraphic refresh display, raster refresh display, liquid crystal display. **10**

2. Interactive devices: Working principles of interactive devices. Interactive devices Mouse, keyboard, tablet, light pen, track ball, touch screen, Button panel. 10

3.Two dimensional transformations: Transformation principles, Translation, rotation, scaling transformations, Homogeneous co-ordinate system, Matrix representation of transformations, combined transformations. 10

4.Three dimensional transformations: Three dimensional geometry, three dimensional translation, rotation, scaling transformations, 10

References:

1) Mathematical elements for computer graphics by David Roger
2) Procedural Computer graphics by David Roger
3) Computer Graphics by Donald Heron
4) Computer Graphics by Neumann Sproul

Program list:

1) Write a program to program to generate co ordinate system.
2) Write a program to obtain 2D translation, rotation, scaling transformations on point.
3) Write a program to obtain 2D translation, rotation, scaling transformation on line.
4) Write a program to obtain 2D Reflection transformation on 2D object.
5) Write a program to obtain 3D translation, rotation, scaling transformations on point.
6) Write a program to obtain 3D translation, rotation, scaling transformations on Cube

Paper –13.1Paper- Software Engineering

Unit-1 10

Introduction- Software crisis and software Engineering approach, Software process- Characteristics of software process, Software development- Problem analysis and software requirements, requirement specification, validation metrics

Unit-2 10

Planning a software project- cost estimation, project schedules, staffing and personal planning, software configuration management plans, quality assurance plans, project monitoring plans, risk management

Unit-3 10

Function oriented design-Design principles, module level concepts, design specifications and notation, structured design methodology, verification metrics Detailed design- module specifications, detailed design, verification metrics

Unit-4 10

Coding- Programming practices, verification and proof of program, Testing- Testing fundamentals and types, functional testing, structural testing, Testing process, metrics-reliability estimation

References-

1. An integrated approach to Software Engineering- Pankaj Jalote
2. Software Engineering- R. S. Pressman
3. Software Engineering –Martin L. Shooman
4. Principles of Software Engineering Management – Glib T.
5. Database System Concepts-Korth Silberschetz
6. Commercial Application Development Using Developer 2000- Ivan Bayross
7. Structured Query Language- Osborne
8. Software Engineering- James Peters and Witold Pedrycz
9. SQL and PL/SQL for Oracle 10g – Dr. P.S. Deshpande (Black Book)

Computer Lab Practical

Various case studies

Library system , Payroll system etc.

Paper-14.1 Linux Operating System Part-I

Unit – I Overview Of Linux
Introduction To Linux , History, GNU & Linux, Architecture, Shell, Kernel, Relationship between Shell & Kernel, Features Of Linux, Comparision to MSDOS & Windows, Log In & Log Out, --Help. 07

Unit – II File System
File, Types – Ordinary Device & Directory, File System, Tree Structure & Functions Of Various System Directories. Directory Management Commands – mkdir, pwd, rmdir, path names, cd, ls, option to ls, inode, Handling ordinary files – cat, cp, rm, mv, wc, split, more, printing with lpr, lpq, lprm, compressing & archiving files 15

Unit – III File Security & Protection
Listing file attributes, ls-l, -d option, type of user, type of access, default access permissions, changing access permissions – symbolic & octal method, changing owner & group. 10

Unit – IV Editor
VI basics, modes – command, input & ex mode, various command mode commands used for text management, repeat factor, inserting text, saving text, writing selected lines, repeating last command, search & replace. 08

References-
Concept of Unix-Sumitabha Das
Unix –Yashwant Kanetkar
Red Hat Linux-User Manual
Beginning Linux Programming, 4ed- Matthew

Lab Course:
1. Log in & Log out to Linux Server
2. Demonstration of Various file management commands
3. Creating & Maintaining directories
4. Changing File Access Permissions & Verifications
5. Creating a text file using VI editor
6. Text Management of existing file using VI editor
7. Inserting, Saving & Writing lines using VI editor

Semester- III

Paper 15.1 Microprocessor 8085

Unit:1 Introduction to Microprocessor 8085 : (14)

Traditional Computer System: CPU and Buses

8085 Microprocessor; Microprocessor – Initiated operations and Bus organization of 8085. Internal Data operations and 8085 registers.

Peripheral or externally initiated operations of 8085.

Memory : Concept of semiconductor memory and memory Map; Types of memories. I/0 devices, I/0 mapped I/0 and memory mapped I/0.

Pin configuration of 8085. Architecture of 8085 microprocessor.

8085 machine cycles and Bus timings.

Unit:2. Instructions Set of 8085 : (6)

Instruction format, Classification of Instruction: Data Transfer, Arithmetic, Logical, Branch and Machine control Instructions.

Concept of Stack and Stack Related Instructions, Subroutine.

Unit:3. Programming 8085 : (8)

Program, Algorithm & Flow chart.

Program of Addition, Subtraction, Multiplication, Division, Block Transfer and Block related operations, Making Ascending and descending order ;

Finding largest and smallest numbers. BCD – to Binary conversion.

Unit:4. Study of 8255, 8253 (8)

Block diagram of 8255, Modes of operations, Control word. Interfacing of LED, Seven segment display, Stepper motor with 8085

Block diagram of 8253, control word, modes of operations.

Reference Books :

1. Microprocessor Architecture, Programming and Applications with the 8085. By. Ramesh S. Gaonkar
2. Microprocessor and its Applications - B.RAM

3. Microprocessor & Applications- Vibhute & Borole

Paper 16.1Discrete Mathematics and Linear Algebra

Unit - I	Lattice	15
	Partial ordering relation, poset, Lattice, Basic properties of lattice, Distributive lattice, complemented lattice, Boolean lattice, Boolean algebra, Boolean expression, CNF, DNF,	
Unit - II	Abstract Algebra and Linear Algebra	20
	Definition and examples of Group, subgroup and basic properties, Definition and examples of ring, integral domain and field, Definition and examples of vector spaces. Subspaces, linear span, linear dependence, independence, basis, finite dimensional vector spaces.	
Unit - III	Graph theory	15
	Graphs, paths, Circuits, sub graphs induced sub graphs, degree of a vertex, connectivity, planar graphs , Trees, spanning trees, cut-sets, fundamental cut sets and circuits, Minimal spanning trees and Kruskal's Algorithm, Matrix Representation of Graphs, Eulerian paths and circuits, Hamiltonian paths and circuits.	
Unit - IV	Introduction to Finite Automata	10
	Finite state Machines, Grammars and Languages finite state machines and their transition table, diagrams, Equivalence of finite state machines, finite automata, Acceptors, Deterministic and non-deterministic automata, Moore - Mealy machines and their equivalence. Definition of a Grammar, Derivations sentential forms, types of Grammars, Languages generated by Grammar.	

Reference Books

1) Discrete Mathematics, S.R. Patil and others, Nirali Prakashan .

2) Algebra, S.R. Patil and others, Nirali Prakashan.

3) Elements of Discrete Mathematics, C.L. Liu MaGraw- Hill.

4) Graph Theory with Applications to computer science and Engineering ,

Narsing Deo, Prentice Hall of India Ltd, New Delhi.

Semester -IV

Paper Number : 11.2
Paper Title : Object Oriented Programming Part-II

Unit - 1Polymorphism. **5**

1. Concept.
2. Types of polymorphism.
3. Overloading of function.
4. Virtual functions.

Unit -2 Operator Overloading and Type Conversion **10**

1. Concept of Operator overloading

2. Rules for overloading operator
3. Overloading of arithmetic,increment and decrement ,negation and relational Operators.
4. Type Conversion.

Unit -3 Inheritance **15**

1. Concept of inheritance.
2. Defining base and derived classes
3. Types of Inheritance
4. Virtual Class.

Unit - 4 Exception Handling (Only Theory Concepts) **10**

1. Basics of exception handling
2. Exception handling mechanism
3. try block – catch block
4. Multiple catch statements

Reference Books-

1. Object oriented programming By E. Balagurusamy.
2. Mastering C++ -By Venugopal.
3. C++ Programming –By D. Ravichandran
4. Let Us C++ By Yashawant Kanetkar.
5. Object Oriented Programming in C++ - Dr. G. T. Thampi, Dr. S. S. Mantha

Computer Lab Practical

1. Write a program in C++ to generate the following pyramid of nos. using polymorphism.

2
2 4
2 4 6
2 4 6 8
2 4 6 8 10

2. Programs based on constructor and destructor
3. Programs based on inheritance concept
4. Programs based on function overloading concept
5. Programs based on operator overloading concept

Paper-12.2 Computer Graphics Part-II

1.Raster scan graphics: Line drawing algorithm (DDA), Bresenham's line generation algorithm, Circle generation algorithm. **10**

2.Scan conversion: Real time scan conversion, concept of frame buffers, character display, polygon filling. **10**

Clipping: Two dimensional clipping, Sutherland Cohen sub division line clipping algorithm, Midpoint subdivision algorithm, concepts of Polygon clipping, Character

3.Clipping. **10**

4.Computer animation: Design of animation sequence, General Computer Animation, Story board, key frame animation system, kinetic system. **10**

References:

1) Mathematical elements for computer graphics by David Roger
2) Procedural Computer graphics by David Roger
3) Computer Graphics by Donald Heron
4) Computer Graphics by Neumann Sproul

Program list:

1) Write a program to generate line for first quadrant using DDA algorithm.
2) Write a program to generate line in first quadrant using Bresenham's line eneration algorithm.
3) Write a program to generate a circle for first octant.
4) Write a program to clip line using midpoint subdivision algorithm.

5) Write a program to show animation over a point.
6) Write a program to show animation over 2d objects.

Paper –13.2
Paper- Relational Database Management System

Unit-1 RDBMS **15**
Dfination of Data and information, database, Concept of DBMS and RDBMS, DBA and responsibilities of DBA, RDBMS terminology- relation, attribute, domain, touple

Unit-2 **10**
Structured Query Language
Features of SQL, Data types, Classification of SQL commands- DDL, DML Commands, Constraints, SQL operators- logical, relational, in, between, like and clauses-order by, group by, having,SQL functions- Arithmetic functions, Conversion functions, aggregate functions, string functions

Unit-3 **10**
Sub queries and join
Sub queries and nesting sub queries, Join- Equi join, simple two table join, outer join, self join,Views, indices, sequence, synonyms

Unit-4 **15**
PL-SQL
Comparison between SQL and PL-SQL, Structure of PL-SQL block, Control Structures- If-Else construct, Loops-loop, For, while, Cursors and triggers- Definition of cursor and trigger, types of cursor-Implicit, Explicit their attributes Types of triggers

References-

1. An integrated approach to Software Engineering- Pankaj Jalote
2. Software Engineering- R. S. Pressman
3. Software Engineering –Martin L. Shooman
4. Principles of Software Engineering Management – Glib T.
5. Database System Concepts-Korth Silberschetz
6. Commercial Application Development Using Developer 2000- Ivan Bayross
7. Structured Query Language- Osborne
8. Software Engineering- James Peters and Witold Pedrycz
9. SQL and PL/SQL for Oracle 10g – Dr. P.S. Deshpande (Black Book)

Computer Lab Practical

1. Creating tables with different constraints , DDL & DML commands
   Examples on Sub Query and different Functions
2. Example on Join
3. PL-SQL block to find largest number from given three numbers
4. PL-SQL block to find factorial of given number
5. PL-SQL block to find given number is Armstrong or not

6. Example on Cursor
7. Example on trigger

Paper-14.2 Linux Operating System Part-II

Unit – I Shell & Process
Shells interpretive cycle, pattern matching, redirection – input, output & error, pipes, tees, command substitution, shell variable.
Process, parent & child, ps, system processes, mechanism of process creation, running a job in background, killing processes with signals. 09

Unit – II Communication & Electronic Mail
Types of Communication, Benefits of communication, Mail, Avoiding mails, news, two way communication – write, talk, mail, elm, pine – viewing mail, composing messages & maintaining address book. 10

Unit – III X – Window System
X – basics, windows manager, CDE, KDE & GNOME, Starting & quitting X, Terminal Emulator, Cut & Paste Operations, Running X – Clients remotely, command line operations, stat up files, X – resources. 10

Unit – IV Networking Tools
TCP/IP basics, Resolving IP addresses, applications, ping - checking network, Telnet – remote log in, FTP – reget, Foo, Cryptography Basics, SSH:The secure shell, DNS, Internet Mail, MIME, World Wide Web, Multimedia on web:MIME revisited. 11

References-
Concept of Unix-Sumitabha Das
Unix –Yashwant Kanetkar
Red Hat Linux-User Manual
Beginning Linux Programming, 4ed- Matthew

Lab Course:
1. Input Output & Error redirection at shell prompt
2. Use of pipes & command substitution at shell prompt
3. Placing a job in a background & terminating the processes
4. Handling mails using mail
5. Demonstration of Two way communication using write & talk
6. Viewing, Composing & sending mail messages using elm
7. Viewing, Composing & sending mail messages using pine
8. Checking network using ping
9. Connecting to the remote machine with telnet
10. Use of GNOME desktop, KDE desktop for various operations

Nature of Practical Question Paper-

Laboratory Course –V

Section-I

Contains Three questions based on paper 11.1 and 11.2

Section –II

Contains Three questions based on paper 12.1 and 12.2

Rules

1. Solve three questions (One question compulsory from each section)
2. Each question carries 25 marks
3. 15 marks for Viva and 10 marks are reserved for journal

Laboratory Course –VI

Section-I

Contains Three questions based on paper 13.1 and 13.2

Section –II

Contains Three questions based on paper 14.1 and 14.2

Rules

1. Solve three questions (One question compulsory from each section)
2. Each question carries 25 marks
3. 15 marks for Viva and 10 marks are reserved for journal

Laboratory Course –VIII

The project should be undertaken preferably by group of two to four students who join the work and implement the project. The group is expected to complete analysis of problem/Task, System design, coding and minimum five to six reports

The external viva-voce examination will be conducted by external examiners appointed by the university.

Marks Distribution:

Documentation -20 Marks

On-line presentation-30 Marks

Viva -50 Marks

Paper 15.2

Microcontroller 8051

Unit:5. INTRODUCTION TO MICROCONTROLLER (10)

Comparison of Microcontroller & Microprocessor, Survey of 4-Bit, 8-Bit, 16-Bit And 32-Bit Microcontrollers and their application areas , Study of 8051 and its Family (89C51, DS5000, 8031, 8032, 8052, 8751).

Architecture of 8051:

Block Diagram of 8051 and Study of Internal Blocks, Reset and Clock,

Registers, Flags and Internal Memory, SFR, I/O Ports.

Unit:6. 8051 INSTRUCTION SET (8)

Study of 8051 Instruction Set and Addressing Modes,

Data transfer, Arithmetic, Logical, JUMP, Loops & CALL instructions, Bit manipulation Instructions.

Unit:7.FACILITIES IN 8051 (10)

Timer and Counter: Timer and Counters, Timer modes, Programming the timers in Mode 1 using assembly and C. Time delay generation.

Serial Port : Serial port of 8051, RS-232 standard and IC MAX–232, Baud rate

in 8051, programming for transmitting character through serial port using assembly and C.

Unit:8. INTERFACING METHODES [8]

Interfacing of LED, Stepper Motor , LCD, DC motor (PWM), Respective programming through embedded C.

Reference Books

1) 8051 Microcontrollers 2nd Edition - Mazidi & Mazidi Pearson
2) 8051 Microcontroller - Ayala Cengage
3) 8051 Microcontroller - Ajay Deshmukh TMH

Practicals

1) Arithmetic operations using 8085 µp kit or simulator

   Addition and Multiplication

2) Arithmetic operations using 8085 µp kit or simulator

   Subtraction and Division

3) Logical operations using 8085 µp kit or simulator

   1) AND 2) OR 3) EX-OR 4) Compare

4) Block transfer using 8085 µp kit or simulator
5) Generation of square wave using Mode -0 or BSR mode of 8255.
6) Interfacing Relay with 8085.
7) Arithmetic operations using 8051 µc kit or simulator

   Addition and Multiplication

8) Arithmetic operations using 8051 µc kit or simulator

   Subtraction and Division

9) Logical operations using 8051 µc kit or simulator
10) Study of timers of 8051 µc kit or simulator

11) Interfacing of LED and switch with microcontroller using 8051 kit.

12)Study of Arithmetic operations using Embedded C.

Paper-16.2 Operations Research

Unit - I	Basics of operations Research, scope, limitations	15
	Linear programming problem, Basic definition, formulation of L.P.P. and Graphical Methods, feasible solution, Basic solution, Basic feasible solution, optimal solution, solution of L.P.P. by Big M- Method	
UNIT - II	Transportation Problems	15
	Introduction to T.P., Initial solution by 1) North west corner method 2) Matrix, minima method 3) Vogel's approximation method optimal solution by MODI method, Maximization in T.P. Unbalanced T.P.	
UNIT – III	Assignment problems	15
	Introduction to A.P. Hungarian method and examples, Maximization in A.P. Assignment problem with restrictions,	

	Unbalanced assignment problem.	
UNIT - IV	Theory of Games	15
	Two person zero sum game, pure and mixed strategies, statement of min-max then, saddle point, solution of 2 x 2 game by arithmetic and algebraic methods, Principle of dominance and solving some simple games. Sub game method, Graphical method for 2 x m and m x 2 game, Representation of game problems as L.P.P.	

Reference Books

1) Operations Research, S.D. Sharma .

2) Principles of Operations Research, H.M. Wagner, Prentice Hall of India.

3) Operation Research, Gupta and Hira .

4) Operation Research, J.K. Sharma.

Equivalence in accordance with titles and contents of papers (For revised Syllabus)

Sr. No.	Title of Old Paper	Title of New Paper
1	**Paper No-11.** Object Oriented Programming	Paper Number : 11.1 Paper Title : Object Oriented Programming-Part-I Paper Number : 11.2 Paper Title : Object Oriented Programming-Part-II
2	**Paper No-12.** Computer Graphics	Paper Number : 12.1 Paper Title :Computer Graphics-Part-I Paper Number : 12.2 Paper Title:Computer Graphics-Part-II
3	**Paper No-13** Software Engineering And RDBMS	Paper Number : 13.1 Paper Title: Software Engineering Paper Number : 13.2 Paper Title : RDBMS
4	**Paper No-14** Linux Operating System	Paper Number : 14.1 Paper Title: Linux Operating System Part-I

		Paper Number : 14.2 Paper Title: Linux Operating System Part-II
5	Laboratory Course –V Based on Paper No 11 and 12	Laboratory Course –V Based on Paper No 11.1, 11.2 and 12.1, 12.2
6	Laboratory Course –VI Based on Paper No 13 and 14	Laboratory Course –VI Based on Paper No 13.1, 13.2 and 14.1, 14.2
7	Laboratory Course –VIII –Project & Viva	Laboratory Course –VIII –Project & Viva
8	Microprocessor and Microcontroller Paper 15	Microprocessor 8085 15.1 Microcontroller 8051 15.2
9	Mathematics II	Discrete Mathematics and Linear Algebra 16.1 Operations Research 16.2

	Nature of Question Paper	
Q.No.1	Multiple Choice based objective type (four options for each question be given)	8 Marks
Q.No. 2	Attempt any two of the following out of three	16 Marks
Q.No. 3	Shot notes (4 out of 6)	16 Marks
	Total	40 marks