Syllabus of

B.Sc. (Information Technology)

Part II (Semester-I)

COMPUTER SCIENCE BOARD

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Chairman, Computer Science Board

GONDWANA UNIVERSITY,

GADCHIROLI

SESSION 2013-2014

B.Sc. (IT) - II (Semester – I)

Paper-1 : Object Oriented Programming with C++

Paper-2 : Statistics and Numerical Method

Paper-3 : Database Programming with Oracle (SQL and PL/SQL)

Paper-4 : Principles of Operating System and Linux

Paper 5 : Practical - I based on Paper 1 and 2

Paper 6 : Practical – II based on Paper 3 and 4

B.Sc. (I.T.) – II
SEMESTER - I
Paper - I: Object Oriented Programming- C++
(3BIT1) (Marks-80)

UNIT -I: Object Oriented Concepts, Tokens, Expressions and Control Structures
Introduction: Basic Elements of Programming, Console I/O Operations**,**
Control Structures: Control and Looping Statements.
Function: Function Prototyping, Call and Return by Reference, Inline Function, Default and const arguments, function overloading, Arrays, Manipulators and Enumeration.

UNIT -II: Classes and Object
Object oriented Methodology: Basic Concepts/Characteristics of OOPs, Advantages and Application of OOPs, Procedural Programming Vs OOPs.
Classes and Objects: Specifying a Class, Creating Objects, Private and Public Data Members and Member Functions, Defining Inline Member Functions, Static Data Members and Member Functions, Arrays within Class, Arrays of Objects, Objects as Function Arguments, Returning Objects.

UNIT -III: Constructors, Destructors, Operators Overloading and Inheritance.
Constructors and Destructors: Introduction, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructors, Dynamic Constructors, const Objects, Destructors.
Operators Overloading: Definition, Unary and Binary Overloading, Rules for Operator Overloading.
Inheritance: Defining Derived Classes, Types of Inheritance, Constructors and Destructors in Derived Classes.

UNIT -IV: Pointers Virtual and Friend Functions and File Handling
Pointers: Pointer to Objects, 'this' Pointer, 'new' and 'delete' Operators, Virtual Function, Friend Functions. Opening and Closing a File, File Modes, File Pointers and their Manipulation.
Sequential Input and Output Operations: Updating a File, Random Access, Error Handling during File Operations, Command Line Arguments.

Books:

1) E Balagurusamy, "Object Oriented Programming with C++ ", TMH,ISBN:- 13- 978-07-066907-9
2) Parimala N.," Object Orientation through C++", Macmillan India Ltd. Pub., ISBN:-0333 93202-1

References:

1) K. R. Venugopal, Rajkumar, T. Ravishankar, "Mastering C++", TMH, ISBN: 0-07-463454-2.
2) D. Ravichandran, " Programming with C++",2nd Ed., TMH, ISBN: 978-0-07-49488-6

B.Sc. (I.T) – II
SEMESTER - I
Paper-II: Statistics and Numerical Methods
(3BIT2) (Marks-80)

Unit-I: Introduction to Statistics

Meaning, Definition, Descriptive Statistics-Functions, Scope, Merits, Demerits, Functions and Importance of Statistics. Statistical Data Collection - Primary And Secondary Data, Methods of Collecting Primary Data Presentation of Statistical Data - Classification; Tabulation; Frequency Distribution; Diagrams and Graphs.

Measures Of Central Tendency (Arithmetic Mean, Median, Mode, Mode, Corrected Mean, Combined Mean, Geometric Mean, Harmonic Mean, Weighted Geometric Mean, Weighted Harmonic Mean, Frequency Distribution Including Less Than or More Than)

Unit-II: Dispersion and Skewness

Dispersion and Skewness: Range, Quartile Deviation, Mean Deviations, Standard Deviation, Karl Pearson's and Bowley Coefficient of Skewness

Correlations Analysis: Simple, Two way and Concurrent Method of Correlation.

Unit-III: Regression Analysis and Index Number

Regression Analysis: Simple, Arithmetic Mean and S.D **a**nd Equation Method.

Index Number: Laspeyre's Method, Paasche's Method. Dorbish & Bowley, Fisher Ideal Method, Time Reversal Test and Factor Reversal Test, Cost of living Index Number)

Unit-IV: Introduction to Numerical Methods

Introduction to Numerical Methods: Approximation and Error in Computing, Significance of Error, Rounding off, Error in Computing, Data Errors, Conversion Error, Round off Error, Truncation Error, Modeling Error, Blunders, Absolute and Relative Error, Error Propagation, Conditional and Stability, Error Estimation, Minimizing the total error, Pitfalls and Precautions

Books:

1) Dr Rahul Sawlikar, "Basic of Computer and Statistical Technique", Das Ganu Prakashan
2) Gupta & Kapoor,"Fundamental of Mathematical Statistics" Sultan Chand & Sons Publication, 11th Edition, ISBN- 8180540049
3) A.K. Agrawal & Sahib Singh, "Fundamental of Statistics", PHI, 4TH Ed.
4) S.S. Sastry, "Introducing methods of Numerical Analysis", PHI Pub, 3rd Ed, ISBN- 81-203-1266-X

References:

1) Levin ,"Statistics for Management" PHI Publication, Murray R. Splegel, "Statistics"
2) S.P.Gupta,"Statistical Method", Sultan Chand & Sons, ISBN-818054026X
3) E Balgurusway, "Numerical Methods", TMH, ISBN-0-07-463311-2
4) Francis Scheil, "Numerical Analysis", Schaum's Outline,2nd Ed, ISBN- 0-07-055221-5

B.Sc. (I.T.) – II
SEMESTER - I
Paper-III: DATABASE PROGRAMMING- Oracle (SQL and PL/SQL)
(3BIT3) (Marks-80)

UNIT I: Introduction to Oracle

Introduction to Oracle as RDBMS, Oracle as A Multi–User System, Logging in and Logging out of Oracle, Database Administrator (DBA): It's Role, Creation of User and Password. Structured Query Language SQL: History and Standardization of SQL, Benefits of SQL, Elements of SQL Languages: Database Objects, Reserve Words, Key Words, Literals, Variables and Data Types.

UNIT II: Commands

Data Definition Command: Create Table, Drop Table, Modify, Alter Table. Integrity Constraints: Data Manipulation Commands: Insert, Update, Delete, Select, Aggregate Functions: Character Functions and Number Functions, Other Clauses: Group By, Order By, Having, Union, Intersect, Minus, Predicates-Like, Between, Null, Not Null.

UNIT III: SQL and PL/SQL

Sub Queries, Views, Joins, Simple Reports Commands, PL/SQL Programming-Structure of PL/SQL, Variables, Dynamic Data type, Control Statements and Looping Statements, PL/SQL Cursors, Types of Cursors, Attributes of Cursors.

UNIT IV: Exceptions, Packages, Triggers

Exception Handling: User Defined, Predefined Exception, Functions, Function Specification, Procedure, Procedure Specification, Package, Package Specification, Package Body, Package Calling, Database Triggers, Syntax, Statement, Body, Restriction, Types.

Books:

1) Kevin Loney, Marlene Theriault, "Oracle 9i:DBA Handbook", TMH, ISBN: 78-0-07-048674-4.
2) Dr. S. B. Kishor, "Oracle (SQL/PLSQL Programming)", Das Ganu Prakshan, ISBN 978-81-921757-5-1.

References:

1) Ivan Bayross "Commercial Application Development using Oracle Developer -2000", BPB Publication, ISBN 81-7029-899-7.

B.Sc. (I.T.) - II
SEMESTER - I
Paper –IV: Principles of Operating System and Linux
(3BIT4) (Marks-80)

UNIT -I: Introduction to Operating System

Operating System: Introduction, Purpose, Function and Role of Operating System.

Types of OS: Concepts of Batch, Multi Programmed, Time Sharing, Parallel, Real Time and Distributed.

Computer System Structure: Computer System Operation, I/O Structure, I/O Interrupt, DMA Structure, Storage Structure and Storage Hierarchy.

Hardware Protection: Dual Mode Operation, I/O Memory and CPU Protection, General System Architecture.

UNIT -II: Operating System Structure

System Components: Process , Main Memory, File I/O System, Secondary Storage Management, Networking, Protection System, Command Interpreter System, Operating System Services, System Call.

Process and Job Control: Process and Types of Process, Process State, Operation on Process, File Manipulation Device Management, Information Maintenance, and Communication.

System Structure: Simple Layered Approach

UNIT - III: Linux

Structure of Linux Operating System, Exploring the directory structure, Naming files and directories

Shell: Bourne, Korn and C-Shells

File System Commands: ls, mkdir, rmdir, cd, cat, mv, cp, rm, ln, pwd, more

Text editing with vi editor, System Administrator and his role.

UNIT- IV: Shell Scripts

Pipe and Filters: sort, grep, egrep **Permission modes:** chmod, chown, chgrp **Process:** ps, kill

Communication Utilities, Shell Scripts: Variables, Arithmetic in Shell Script, Control flow statements, Shell Parameters.

Books:

1) Andrew S.Tanenbaum, "Modern Operating Systems" ,Second Edition, PHI, ISBN: 81-203-0974-X
2) Jack Tackett, Jr. and Steven Burnett, "Using Linux", PHI (5th Ed),ISBN: 0789716232
3) Brian Proffitt, "Install Configure and Customize (Red Hat Linux 7)", PHI, ISBN-761531505
4) Grant Taylor, "Linux Complete" , BPB pub., ISBN : 81-7656-170-3

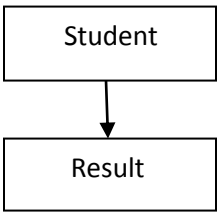
References:

1) Brain Proffitt, "Red Hat Linux 7",PHI.
2) Abraham Silbeschatz, "Operating System Concepts", Bell Labs Peter Baergalvin Replika Press Pvt. Ltd. Delhi, ISBN: 9971-51-388-9
3) "Teach Linux in 24 hours", SAMS Techmedia,ISBN:81-7635-499-6.

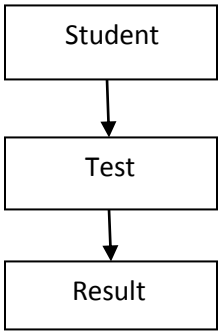
B.Sc. (I.T.) – II
SEMESTER - I
Practical - I: Object Oriented Programming- C++
(3BIT5)

1. Write a cpp program to find roots of quadratic equations.
2. Write a cpp program that will ask for a temperature in Fahrenheit and display in Celsius.
3. Write a cpp program which accepts marks of three subjects. Calculate total & average marks and also check student is pass or fail. (if average above or equal to 50 the 'Pass') .
4. Design a menu driven program using switch case which accepts two integer values and program will display menus for addition, subtraction, multiplication, division and ask user to select appropriate choice.
5. Design inline functions for add and multiply of two integer numbers.
6. Write a cpp program to overload "sum()" function for add two integers, to add three real and add three integers.
7. Write a cpp program for following series.
   Sin X= $X - X^3/3! + X^5/5! - X^7/7! + \ldots\ldots\ldots$
8. Write a cpp program for following.
   Cos X= $1 - X^2/2! + X^4/4! - X^6/6! + \ldots\ldots\ldots$
9. Design a class "Complex" with real and imaginary members also design appropriate member function to get and print complex numbers.
10. Design a class " Time" with hours and minutes as data members and to get and print data of Time class also design a sum() with object as arguments to add two objects of Time class.
11. Design a class "Employee" with appropriate members. Demonstrate array of objects.
12. Create a class " Complex" with real and imaginary members and to initialize them write overloaded constructor for i) Default constructor ii) Constructor with one parameter iii) Constructor with two parameters.
13. Create a constructor for "Integer "class with M and N as data members and constructor for initialize data members.
14. Design a class "String" with name and length as data members. Create a dynamic constructor to initialize object of any length can be created.
15. Create a class "Employee" with empno, ename, salary as data members and create Copy constructor to create objects from already created objects.
16. Write a cpp program to overload unary '++' and '- -" operator for "Sample" class with X,Y, Z of integer type.
17. Write a cpp program to overload binary '+' operator for Complex Class. (Complex class is already design).

18. Write a program to Single inheritance for following structure.
    Student Class (rollno, sub1, sub2) and Result class(total,avg)



19. Write a class for Multilevel Inheritance for following structure
    Student class (rollno),Test Class(sub1,sub2), Result Class(total, avg)



20. Write a program in show () and display () function are overridden. Demonstrate use of virtual function for runtime polymorphism.
21. Write a program which demonstrates the pure virtual function.
22. Write a cpp program in which use pointer to Sample class objects are used. Demonstrate it.
23. Write a cpp program which read contents from file and counts no. vowels and consonants in a file.
24. Write a cpp program which counts no. command line arguments on command line.
25. Write a cpp program which read a file and write contents of a file without white spaces into another file.
26. Write a cpp program which reads contents from a file and the even nos. are copied to "even.txt" and odd nos. are copied to "odd.txt" file.
27. Write a cpp program which demonstrates use of this pointer.

B.Sc. (I.T) – II SEMESTER - I
Practical - I: Statistics and Numerical Methods
(3BIT5)

STATSTICAL METHODS

1) Write a C++ program to compute the present value of a payment of
    a. Rs.25,000 to be made 5 year in the future at a discount rate of
    b. 16% per annum
2) write a c++ program to compute the future value of an amount of
    a. Rs.10,000 in 3 years at a discounted rate of 14% per annum.
3) Write a program C++ to find the modal mark of the distribution.

Marks	20-30	30-40	40-50	50-60	60-70	70-80
Students	8	10	26	28	10	4

4) The frequency distribution of the weights of a number of students is given below.

Weight(kg)	55	56	57	58	59	60	61	62	63	64
Frequency	12	18	27	35	37	34	30	26	17	9

Write a program in C++ to find the mean, mode and median weight of the students.

NUMERICAL METHODS

1) Finding the truncation error in a series of Approximation
2) Calculate the value of integration using trapeziodal rule. The function to be integrated is f(x) = 1/x
3) Calculate the value of integration using simpson's 1/3 rule. The function to be integrated is f(x) = 1/(1+x)
4) Calculate the value of integration using simpson's 3/8 rule. The function to be integrated is f(x) = 4 + 2 sinx
5) Calculate the value of y at given value of x using euler's method. The function y' = f(x,y) = x * x+ y
6) Calculate the value of y at given value of x using Second order of Runga kutta method. The function y' = f(x,y) = (1 + x*x + y*y)
7) Newton Raphson method to find the root of an equation. The function f(x) = x^5 + 5x^2 + 1 f'(x) = 5x^4 + 10x

B.Sc. (I.T.) – II SEMESTER - I
Practical -II: DATABASE PROGRAMMING- Oracle (SQL and PL/SQL) (3BIT6)

1) Create following Tables and Execute the respective PL/SQL blocks.
    - Create table employee with the fields (empno, ename, job, hiredate, jadate &sal).
    - Create table Math with fields (numb, square, cube & square_root).
    - Create table Patient with fields (pname, age, prescription).
    - Create table Musicalbum with fields (title, hero, singer, qth).
    - Create table Stu with fields (name & marks).
    - Create table errorh with fields (error_no & description).
    - Create a table DONAR where following fields(Donar no., donar name, city, age, Sex, Blood group, quantity of blood given, date of donation)

2) Write a PL/SQL block to accept employee number and display his/her job, joining date and salary of employee. Define the variable using %rowtype.
3) Write a PL/SQL block to accept three paper marks and display result if student scores more than 35 marks in each paper and also specify the class.
4) Write a PL/SQL block to find the square, cube, square root of nos.bet 1 & 25 using loop.
5) Write a program to divide a number by character number. If any error occurs it should be handled properly, and store the error number and its description in a table called errorh.
6) Write a PL/SQL block to accept and insert a valid data into the table patient. Write appropriate user defined exception.
7) Write a PL/SQL block, to display only title and quality of all album stored in the table musicalbum.
8) Write a PL/SQL to delete the records from table musicalbum where quantity is less than 4 using cursor.
9) Write a PL/SQL block to display the employee all having salary>somevalue. The value somevalue can be passing during execution or through bind variable.
10) Write a PL/SQL block to accept the title and display other information; it must handle the exception properly.
11) Write a procedure to swap two numbers.
12) Write a procedure to insert values into a table stu. Write a PL/SQL, main program to call the procedure stu_insert.
13) Write a function which is able to perform addition of two numbers.
14) Write a function which is able to perform addition of two numbers as well as addition of three number using default argument concepts.
15) Write a package, which contain two procedures.
16) A procedure which display the data of stu.

17) A procedure which store the data into the table stu.
18) Write trigger before inserting or updating a name into the table stu name will be automatically converted into uppercase.
19) Write a trigger on a table stu, that whenever user try to insert a marks of math either less than zero or greater than 100 a trigger must fire before insertion or updating of records.
20) Use DONAR table and write a PL/SQL block to accept donar number and display the donar detail and find how many days it pass from the last donation.
21) Write a PL/SQL block to accept donar number, donar name, city, age, sex, blood group, quantity and date of donation and store the data into the table DONAR. Use user defined exception for handling various exception like donar name should not be blank, age of donar should be at least 18 years and so on. Also use STORAGE_ERROR exception to check storage is available or not.
22) Write a PL/SQL block to accept donar name and display the information of donar. If duplicate or no donar found then proper exception should be raised.
23) Create a procedure that displays the information of donar by accepting donar number.
24) Write a trigger which will not allow the user to work on table DONAR during period say 9 am to 9:30 am, on any day.
25) Write a trigger on a table Donar, that whenever user try to insert a quantity greater than 500 ml a trigger must fire before insertion or updation of records.

B.Sc. (I.T.) - II
SEMESTER - I
Practical -II: Principles of Operating System and Linux
(3BIT6)

PRACTICAL BASAED ON OPERATING SYSTEM USING C

1) A PROGRAM TO FIND THE TOTAL BASE MEMORY
2) A PROGRAM TO FIND THE TOTAL FREE SPACE MEMORY
3) A PROGRAM TO FIND TO KNOW BOOT DRIVE DISK
4) A PROGRAM TO FIND NO. OF DRIVE ATTACH TO SYSTEM
5) A PRGRAM TOKNOW THE VARIOUS INFORMATION OF DISK
6) A PROGRAM TO KNOW THE VARIOUS STATUS OF EQUIPMENT LIKE NUMBER OF PRALLEL PORT, SERIAL AND GAME PORT IS PRESENT OR NOT, TYPE OF VIDEO MODE
7) A PROGRAM TO CHECK MATH-COPROCESSOR IS INSTALLED OR NOT
8) A PROGRAM TO PRINT SYSTEM DATE, TIME AND TO CHECK WHEHTER MOUSE IS INSTALLED OR NOT.
9) A PROGRAM TO KNOW THE STATUS OF IMPORTANT KEY ON KEYBORD

PRACTICAL BASAED ON LINUX

1) Perform the following Directory Commands
   a) pwd b) ls c) mkdir d) cd e) rmdir
2) Perform the following File management Commands
   a) Cat b) cp c) ln d) rm e)more f) mv
3) A Shell Script to perform various arithmetic operations.
4) A Shell Script that takes two numbers from keyboard and display their average as an output.
5) A Shell Script to display current date, users who have logged in, process status and calendar of the month.