St Aloysius College (Autonomous)

Mangaluru

Re-accredited by NAAC "A" Grade

Course structure and syllabus of

B.Sc.

COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM

(2019 – 20 ONWARDS)

MODIFIED IN 2020

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(ಸ್ವಾಯತ್ತ)
ಮಂಗಳೂರು– 575 003

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Re-accredited by NAAC with 'A' Grade - CGPA 3.62
Recognised by UGC as "College with Potential for Excellence"
College with 'STAR STATUS' conferred by DBT, Government of India
3rd Rank in "Swacch Campus" Scheme, by MHRD, Govt of India

Date: 25-06-2020

NOTIFICATION

Sub: Syllabus of **B.Sc. Computer Science** under Choice Based Credit System.

Ref: 1. Decision of the Academic Council meeting held on 09-06-2020 vide Agenda No: 23(2020-21)
2. Office Notification dated 25-06-2020

Pursuant to the above, the Syllabus of **B.Sc. Computer Science** under Choice Based Credit System which was approved by the Academic Council at its meeting held on 09-06-2020 is hereby notified for implementation with effect from the academic year **2020-21**.

ST. ALOYSIUS COLLEGE MANGALURU 575 003 (AUTONOMOUS)

PRINCIPAL

REGISTRAR

To:
1. The Chairman/Dean/HOD.
2. The Registrar Office
3. Library

PROGRAMME OUTCOMES	
PO-1:	Program develops professionals as a resource to IT Field and equipped students to start their own business as software developers, programmers, database administrators, and system analysts.
PO-2:	Graduates are empowered to learn new ideas and technology as the field evolves.
PROGRAMME SPECIFIC OUTCOMES	
PSO-1:	The ability to understand the principles and working of the hardware and software aspects of computer systems.
PSO-2:	Ability to design, develop, implement computer programs and use knowledge in various fields and hence to provide solution to new ideas and innovations.

SYLLABUS STRUCTURE OF COMPUTER SCIENCE PAPER AS ONE OF THE OPTIONAL SUBJECT FOR B.Sc. THREE YEAR DEGREE PROGRAMME

Subject Code	Sem	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of Exams (Hours)	Marks and Credits			
						IA	Exam	Total	Credits
G505.1	I	Problem solving using C	4	-	3	20	80	100	2
G505.1P	I	C Programming Lab	-	2+2	3	10	40	50	1
G505.1E(i & ii)	**I**	**Introduction to computers**	**2**	**-**	**2**	**10**	**40**	**50**	**1**
G505.2	II	Data Structure Using C	4	-	3	20	80	100	2
G505.2P	II	Data Structure Lab using C	-	4	3	10	40	50	1
G505.2E(i& ii)	II	Cyber Security	2	-	2	10	40	50	1
G505.3	III	Java Programming	4	-	3	20	80	100	2
G505.3P	III	Java Programming Lab	-	3	3	10	40	50	1
G505.3(i)E	III	Basics of Android Programming	1	1	2	10	40	50	1
G505.3(ii)E		Computer Hardware and Maintenance	2	-	2	10	40	50	1
G505.4	IV	Relational Data Base Management System Using MySQL	4	-	3	20	80	100	2
G505.4P	IV	RDBMS Lab	-	3	3	10	40	50	1
G505.4E	IV	Office Automation	1	1	2	10	40	50	1
G505.5A1/ G505.5A2	V	Operating System and Linux/ Principles of TCP/IP	3	-	3	20	80	100	2
G505.5B1/ G505.5B2 Elective Paper	V	Python Programming/ J2EE	3	-	3	20	80	100	2
G505.5AP & G505.5BP	V	Shell Programming using LINUX/ Principles of TCP/IP Lab& Python Lab/J2EE lab	-	2+2	2+2	20	80	100	2
G505.6A1/ G505.6A2	VI	Data Analytics / Software engineering and testing	3	-	3	20	80	100	2
G505.6B1/ G505.6B2 Elective Paper	VI	Web Programming using PHP/ Computer Networks	3	-	3	20	80	100	2
G505.6AP & G505.6BP	VI	Data Analytics lab/ Software Engineering Lab & PHP Lab/ Computer Networks lab	-	2+2	2+2	20	80	100	2

compulsory Bridge Course will be conducted for the new entrants without computer science background for 12 hours during the first two weeks –After Class Hours

Bridge Course for B.Sc. Computer Science – Semester I

UNIT – I

Fundamentals of Digital System

Binary number, Octal and Hexadecimal numbers, Number Base Conversions, Complements, Positive and negative numbers ***(3 hours)***

UNIT – II

Fundamentals of Computer Systems

Generation of Computers, Characteristics of computers, types of computers, Block Diagram of Computer- input/output devices- keyboard, mouse, monitor, CPU, Types of storage devices – Magnetic storage devices, Optical Storage devices ***(3 hours)***

UNIT – III

Fundamentals of Programming

Transforming data into information – How a Computer Processes data. Algorithms- input, process and output, Flow Chart – Examples, Implementation using Raptor Tool ***(3 hours)***

UNIT –IV

Fundamentals of MS Office

Word processing using MS Word – Editing & Formatting Text, Table Creation, Mail Merge - Practical Demonstration ***(3 hours)***

Reference: NCERT Book for First Year Pre University Course

I B. Sc - Computer Science (I Semester- Paper 1)

G 505.1 – Problem solving using C

Learning Objectives:

- Course is designed to provide complete knowledge of structured and procedural programming understanding
- To improve skills in developing logics which will help students to create programs. By learning basic programming constructs students can switch over to any other language.

Learning Ootcomes

CO-1. Interpret the basic principles of C Programming.

CO-2. Acquire decision making and looping concepts.

CO-3. Design and develop modular programming

CO-4. Explore usage of Arrays, strings, structures and files.

CO-5. Effective utilization of pointers and preprocessor directives.

C0-6. Illustrate the concepts of various data structures.

UNIT I

Overview of C

Importance of C, Sample C programs, Basic structure of C program, executing a C Program in Linux

Constants, Variables, and Data Types

Character set, C tokens, Keywords and identifiers, Constants, Variables, Data Types, Declaration of variables, Assigning values to variables, Defining symbolic constants

Operators and Expression

Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and decrement operators, Conditional operator, Bit wise operators, Special operators, Arithmetic expressions, Evaluation of expressions, Precedence of operators and associativity, Type conversions in expressionsPreprocessor Directives

Managing Input and Output Operations

Reading a character, writing a character, formatted input, formatted output

12 Hours

UNIT II

Decision Making and Branching

Decision making with IF statement Simple IF statement The IF ELSE statement, Nesting of IF…ELSE statements, The ELSE IF ladder, The switch statement,, GOTO statement

Decision Making and Looping

The WHILE statement, The Do statement, The FOR statement, Jumps in loops

Arrays

One–dimensional arrays, Two-dimensional arrays **12 Hours**

UNIT III

Handling of character strings

Declaring and initializing string variables, Reading string from terminal, Writing strings to screen, Arithmetic operations on characters Putting strings together, Comparison of two strings, String-handling functions, Table of strings.

User- Defined Functions

Need for user-defined functions, The form of C functions, Calling a function, category of functions, Nesting of functions. Recursion, Functions with arrays, The scope and lifetime of variables in functions. **12 Hours**

Unit IV

Structure and Unions

Structure definition, Structure variables, Initialization, Accessing structure members, Unions

Pointers

Understanding pointers, Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointer, passing pointers to functions, pointers and one dimensional arrays, dynamic memory allocation

File management in C

Defining and opening files, closing file, Input output operation on files

12 Hours

Text Books;

1. E. Balagurusamy, Programming in ANSI C

Reference Books:

1. Let Us C - BPB Third Edition YashavantKanetkar
2. Programming with C – Second edition - Byron Gottfried

Scheme of Theory Examination:

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART-A

Two mark questions – 10/12

Equal weightage should be given to each unit. **20 Marks**

PART-B consists of 4 Units. A student will select ONE full question from each unit.

4x20=80 Marks

G505.1P - C Programming LAB (Linux Based)

Semester-I

CO-1. Demonstrate an understanding of computer programming language concepts.

CO-2. Student able to develop C programs on Linux platform.

CO-3. Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.

CO-4.

Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures

CO-5 Student must be able to define union and enumeration user defined data types.

List of Programs in C: PART A

1. Program to find the largest among three numbers.
2. Program to count *+ve^* -ve& 'zeros among n integers using tertiary operator.

3. To read empno, name and basic salary. Calculate DA, HRA, PF, IT, Gross pay and Net pay using the condition given below:

Basic salary	Da	HRA	PF	IT
<5000	2.2%ofbasic	4.3% of basic	1.5%ofbasic	NIL
>=5000&< 10000	4.0%of basic	5.5% of basic	2.3%of basic	425
>=10000	6.0%ofbasic	7.35%of basic	3.5%of basic	1.5% of basic

4. To find the sum of the individual digits of a given integer also find the reverse of it.
5. To display & to find the sum of the 'N' natural numbers
6. Program to display first 'n' Fibonacci series.
7. Program to convert *a* decimal number to binary.
8. Program to find the factorial of a number.
9. Program to find the GCD and LCM of 2 numbers.
10. Program to check entered number is prime or not.
11. To count the number of +ve's, -ve's& O's in a single dimensional array of nintegers.
12. To sort 'n' elements of a single dimensional array(BUBBLE SORT). ,.
13. To find the largest & smallest in one dimensional array. .

PART B

14. To transpose a matrix of order NXM & check whether it is symmetric or not.
15. To add the individual elements of two matrices of order NXM.
16. Program to enter a 3x3 matrix and to find Sum of each row.
17. Program to concatenate 2 strings and also to find the length of the string without using built-in functions
18. Program to count the total number of words and blank spaces in a sentence
19. To find "Cr of a number. (Using factorial function)
20. Program to find the given string is palindrome or not. Use an user defined function to reverse the string.

21 & 22.Two programs on structures.

23. Program to compare 2 strings using pointers.

24. Program to create a text file containing single line of text and to count individual vowels in it.

25. Program to create a file of integers and store the even nos in the file "EVEN.DAT" and odd numbers in "ODD.DAT" file.

Scheme of Practical Examination;

Practical (Three hours of duration for 40 marks)

One Program from Part A 10marks

One Program From Part B: 20 marks

Record -5 Marks, Viva – 5 Marks

Suggestion by BOS :

Write flow chart for all the programs (may use raptor tool)

I SEMESTER: CBCS: Elective Paper 1 (G505.1E)

CO-1. Recognize different types of number systems as they relate to computers. Add and subtract in binary, octal, and hexadecimal number. Convert values from decimal, binary, octal, hexadecimal, and binary-coded decimal number systems to each other and back to the other systems

CO-2. Learning simplification in logic gates by referring K-map and Designing and demonstrating various types of sequential circuits using flip flops.

CO-3. Students acquire the knowledge of basics of computers, hardware and software's and operating systems. Explore different ways of communicating with I/O devices and interfaces

INTRODUCTION TO COMPUTERS

UNIT – I

Number Systems

Binary number – arithmetic operations with binary numbers, octal and hexadecimal numbers, number base conversions, complements, binary codes, positive and negative numbers, addition in the 1s complement system, addition in the 2s Complement System.

Boolean algebra and Gate Networks

Basic definitions, axiomatic definition of Boolean Algebra, basic theorems and properties of Boolean Algebra, simplification of Boolean expressions using theorem and perfect induction, Boolean functions Canonical and Standard forms – SOP and POS, implementation of digital logic gates **(10Hrs)**

UNIT – II

Simplification technique in Logic Design

K – Map, method of simplification. two and three variable maps, four – variable maps, don't care conditions (only on respect to some of product) **.**

Sequential Circuits

Introduction, Flip-Flops, RS, D, JK, T Flip-Flops, Triggering of Flip – Flops. Registers – Shift Registers, Serial Load and parallel load. **(10Hrs)**

UNIT – III

Knowing computer:

What is Computer, Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Concept of Computing, Data and Information. What is an Operating System; Basics of Popular Operating Systems; Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet.

Storing information in a Computer

Type of storage devices – Magnetic storage devices, Optical Storage devices, measuring device performance. **(10Hrs)**

Text Books

1. Digital Logic and Computer Design, M Morris Mano, Pearson India Education Services Pvt. Ltd. 2016
2. Introduction to Computers, Peter Norton, Seventh Edition, Tata McGraw Hill Education Private ltd.

Reference Books

1. Digital Computer Fundamentals, Thomas C Bartee, sixth Edition, Mc-Graw Hill Inc.
2. Fundamentals of Computers, V Rajaraman, Sixth edition, PHI

OPEN ELECTIVE

I Semester

G505.1E Computer System Architecture

Unit -1

Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt**.**

(12 Hours)

Unit -II

Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control.

(8 Hours)

Unit-III

Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming.

(6 Hours)

Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.

(4 Hours)

Text Book

1. M. Mano, Computer System Architecture, Pearson Education 1992.

Reference Book

W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India ,2009

I B.Sc. - Computer Science (II Semester- Paper 2)

G505.2 – DATA STRUCTURE USING C

Learning Objectives:

- Helps to learn how the choice of data structures and algorithm design methods impacts the performance of programs.
- Helps in understanding abstract data types like stack, queue and list.

Learning Outcomes

CO-1 Demonstrate and classify various data structures and their Primitive operations.

CO-2. Apply the concepts of arrays and strings in sorting and pattern Matching applications.

CO-3. Learning the operations of linear data structures like stacks, Queues and linked lists.

CO-4. Demonstrate primitive operations on different types of trees and Their applications.

CO-5. Summarize the concepts of graphs, traversal techniques, hashing and file handling.

C0-6. Design and develop solutions to solve various computing Problems by choosing appropriate data structures.

UNIT - 1

Linear Data Structure and their sequential storage representation

Algorithmic notations, concept and terminology for non-primitive Data structures, Storage structures for arrays, Stacks, Definitions and Concepts, Operating on stacks, Applications of stacks - Recursion, Infix to postfix, Evaluating postfix expressions, Queues -priority Queues, DQueue.

12 HOURS

UNIT – 2

Linear Data Structure and their Linked storage representation

Pointers and Linked Allocation, Linked linear lists, Operations on Linear lists using singly linked storage structures, Circularly Linked linear lists, Doubly Linked linear lists.

12 HOURS

UNIT – 3

Nonlinear Data Structures

Trees

Definition and Concepts, Operations on Binary Trees, Linked Storage Representation of Binary Trees, Tree creation and Traversal.

Graphs

Matrix representation of graphs, Breadth First Search, Depth First Search.

12 HOURS

UNIT – 4

Sorting and Searching

Sorting - Selection Sort, Bubble Sort, Merge Sort, Quick Sort, Heap Sort, Searching - Sequential Searching, Binary Searching, Search Tree. **12 HOURS**

Text Books

1. An Introduction to Data Structures with Applications 2nd edition – J.P. Trembly and Sorenson, McGraw Hill 2000.

Reference Books

1. Data structures using C & C by YedidyahLangsun, Moshe J Augenstein, Teneinbaum published by Prentice Hall of India Ltd.
2. Data Structure Using C by M Radhakrishnan and V Srinivasan
3. Systematic Approach to **Data Structures using C by A M Padma Reddy**
4. **Dta Structures through C by Yashwant P Kanetkar**
5. Fundamentals of Data Structures by Horowitze, E and Sahni,S , Galgotia bookstore.
6. Data Structures and program design by Robert, L.Krunse,PHI.
7. Data and File Structures by Mary Lunis , PHI.
8. Theory and problems of Data structures by Seymour Lipshutz,McGraw Hill.

Scheme of Theory Examination;

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART-A Two mark questions – 10/12

Equal weightage should be given to each unit. **20 Marks**

PART-B consists of 4 Units. A student will select ONE full question from each unit.

4X20=80 Marks

II B. Sc - Computer Science –Data Structure Lab Using C - G505.2P

CO-1. Solve computational problems using basic C language Constructs. Design and implement operations on both single and Multidimensional arrays.

CO-2. Develop menu driven programs to demonstrate primitive Operations on stacks & queues.

CO-3. Assess the operations on different types of Trees.

CO-4. Demonstrate traversal techniques on graphs.

CO-5. Apply appropriate data structures to solve computing problems.

PART A	
1.	Program to implement stack operations using arrays.
2.	Program to evaluate a postfix expression.
3.	Program to convert an infix expression to its equivalent postfix expression.
4.	Program to implement queue operations using arrays.
5.	Program to sort elements using Bubble Sort.
6.	Program to sort elements using Selection Sort.
7.	Program to sort elements using Quick Sort.
8.	Program to search for an element using Linear Search.
9.	Program to search for an element using Binary Search.
10.	Program to implement stack operations using linked list.
11.	Program to implement queue operations using linked list.
12.	Program to implement circular queue operations using arrays.
13.	Program to perform the following operations on a linked list - Display - Search for an element - Insert at the beginning position - Insert at the end position - Insert at a given position

	- Delete from the beginning - Delete from the end - Delete from a given position - Count the number of node in the list **Note***: During Examination any 3 options may be asked*
14.	Program to perform the following operations on an ordered linked list. - Insert inorder - Delete inorder
15.	Program to perform inorder, preorder and postorder traversal of a binary tree.

Scheme of Practical Examination:

Practical (Three hours of duration for 40 marks)

Record- 5 Marks , Viva – 5 Marks

One question from Part A: 10 marks

One question from Part B: 20 marks

Bridge Course or short term course on C++ : General concept of OOP's, Polymorphism and Encapsulation, Operator Overloading, Different types of Inheritance, New operator – to be completed before the students come to Second Year programme. Also data base using MS Access to be taught

II SEMESTER: CBCS: Elective Paper (G505.2E)

INTRODUCTION TO DATA SCIENCE

UNIT-1

Introduction to Data Science

Definition of Data Science, Data science classification, data science algorithms, Data preparation, modelling & application.

Data Management, Classification and Regression

Data sets, Descriptive statistics, Data visualization, Decision trees, Rule induction, KNN, Naive-Bayesian, Artificial neural networks, SVM, Linear and logistic regression.

15 HOURS

UNIT-2

Clustering model evaluation

k-means, DBSCAN, Self-organizing maps, Introduction to Text mining and Deep learning

Anomaly detection and Feature selection

Distance and density based outlier analysis. Classification of feature selection methods, PCA

15 HOURS

Text Book:

Data Science: Concepts and Practice - By Vijay Kotu, Bala Deshpande, 2nd edition, Publisher -Morgan Kaufmann, 2018

Reference books:

1. **Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data,** EMC Education Services, John Wiley & Sons, 05-Jan-2015
2. **Data Science For Dummies,** Lillian Pierson, John Wiley & Sons, 21-Feb-2017
3. **Doing Data Science: Straight Talk from the Frontline,** Cathy O'Neil, Rachel Schutt, "O'Reilly Media, Inc.", 09-Oct-2013

OPEN ELCTIVE
II Semester
G. 505.2E CYBER SECURITY

CO-1. Students will be familiar with cyber security landscapes and able to Analyze and evaluate the cyber security needs of an organization.

CO-2. Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.

CO-3. Measure the performance and troubleshoot cyber security systems.

CO-4. Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.

CO-5. Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators.

Unit I

Information System

Introduction to Information Security – Need for Information Security, Information Security Management, Threats to Information system, Information System Attacks

Information Assurance – Information assurance Process, Scope of Information Assurance, Information Assurance Model, Security Counter Measures, Time **(8 Hours)**

Unit II

Cyber Security – Need of Cyber Security, Cyber Security Model, Security Risk Analysis

Application Security

Introduction to Application Security, Security Testing For Applications, Data Security, Database Security, Email Security, Internet Security **7 Hours**

Unit III

Security Technologies

Introduction, Firewalls, Virtual Private Network – Types of VPN, Benefits of VPN, Intrusion Detection System, Access Control

Security Threats

Introduction, Virus Attacks, Email Viruses, WORMS, Trojan, Logic Bombs, Phishing and Spoofing Attacks, Malware, Denial of Service (**8 Hours)**

Unit IV

Security Threats to Ecommerce

Introduction, Electronic Payment system, Credit Card, Debit Card, Digital signature, Cryptography

Developing Secure Information system

Security at various phases of Information System Development, Physical Security of Information assets, Application Development Security, Information Security Governance and Risk Management, Security Issues with Downloadable Services, CCTV and Intrusion Detection, Backup Security Measures. **(7 hours)**

Text Book

AvantikaYadav, Cyber Security, Narosa Publishing House

Reference Books

M. Merkow, J. Breithaupt, Information Security Principles and Practices, Pearson Education.2005

II B. Sc - Computer Science (III Semester- Paper 3)

G505.3- JAVA PROGRAMMING

Learning Objectives:

- Introduction of a portable and secure programming language.
- Useful in designing desktop and web applications.
- Course is helpful to learn the implementation of object oriented concepts.

Learning Outcomes:

CO-1. Identify classes, objects, members of a class and relationships among them needed for a specific problem...
CO-2. Write Java application programs using OOP principles and proper program structuring.
CO-3. Demonstrate the concepts of polymorphism and inheritance
CO-4. Write Java programs to implement error handling techniques using exception handling

Unit-I

java support systems, java environment, java program structure-Tokens, statements, java virtual machine, constants and variables, data types, declaration of variables, symbolic constants, type casting, operators- Arithmetic, Relational, Logical, Assignment, Increment and decrement operators, conditional, bitwise, special operators, Decision making and Branching Statements

Loops-while, do, for, Break and Continue statement **12 Hours**

Unit-II

Class- Introduction to Classes and Objects, Defining a class, field declaration, method declaration, Creating objects, Accessing class Members, Constructors, Method overloading, static members, Nesting Methods, Inheritance-Extending a class, overriding methods, Final variables and methods, Final classes, Finalizer method, Abstract Methods and Classes, visibility control. **12 Hours**

Unit-III

Arrays - one dimensional and two dimensional arrays, Strings, Vectors, wrapper classes, Defining Interface, Extending and Implementing Interfaces, Accessing Interface variables, System Packages- using System packages, Naming Conventions, creating and using user defined packages, hiding classes. **12 Hours**

Unit-IV

Creating Threads, extending Thread class, stopping and Blocking a Thread, life cycle of a thread, Using thread methods, thread priority, synchronization, implementing the

Runnable interface, Exception handling – try- catch block, Multiple Catch Statement, Using Finally block, Throwing User Defined Exceptions

Applets - Building Applet Code, Applet lifecycle, Creating an executable Applet, JDBC - The connectivity models JDBC/ODBC bridge

12 Hours

Text Books:

Programming in Java 2nd edition: by E.Balaguruswamy. TMH

Reference Books:

1) Peter Norton guide to Java Programming by Peter Norton -TechMedia Publications.
2) Java Black Book by Steven Holzner - Coriolis Group Books
3) Let us Java-YashavantKanetkar
4) The Complete Reference JAVA2 by NaughtonSchidt -TMH

Scheme of Theory Examination:

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART-A consists of 12 questions of 2 marks each. A student will select 10 questions.

2X10=20 Marks

PART-B consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G505.3P : JAVA PROGRAMMING LAB (Linux Based)

CO-1. Students learn to defining Classes and Objects, Identify classes, objects, members of a class and relationships among them needed for a specific problem.

CO-2. Write JAVA programs to demonstrate method overloading.

CO-3. Demonstrate the concepts of polymorphism , inheritance and method overriding V/s method overloading.

CO-4. Explain the benefits of JAVA's Exceptional handling mechanism compared to other Programming Language.

CO-5. Write Java programs to implement error handling techniques using exception handling.

Program List

SL.NO.	PART – A Name of the programs
1.	Write a Java Program to accept Integers from the user, ask for Lower and Higher integer limits, and then Compute the following: a. Sum of Integers that are Inside the Range b. Sum of Integers that are Outside the Range
2.	Write a Java Program to perform Binary Search in an Array of Integers taken by the user using Command Line Arguments.
3.	Write a Java Program to generate 'n' Fibonacci Series and display only Prime Numbers present in it.
4.	Write a menu driven program accept a number and a). Reverse the number b). Sum of integers c). display whether it is palindrome
5.	Define a class 'Matrix' with the following methods: addMatrices, subtractMatrices, multiplyMatrices, getMatrix. Write a Menu Driven Java Program: a. Accept values in the Matrices b. Display Matrices c. Add Matrices d. Subtract Matrices e. Multiply Matrices f. Exit
6.	Write a java program to accept several command line arguments, and count the number of valid integers, floating point integers among them.
7.	Write a java program to extract a portion of string and print the extracted portion of it.
8.	Write a java program to accept 2 stored arrays and merge them so that the merged array is sorted.
9.	Write a java program to calculate area of a cube, cylinder,cone using polymorphism.
10.	Write an Applet Program to display Three Numbers and also the Maximum of

	the Three Numbers.
11.	Write an applet program to display circle, rectangle, oval and line.
12.	Write an Applet Program to display the given String, Reverse of the String and whether it's Palindrome or not.
13.	Write an Applet Program to Sum the Individual Digits in a Number till it becomes a Single Digit Number and Display that Sum.
14	Graphics Program
	PART B
1.	Define a superclass 'Employee' with members employeeNumber, employeeName, basicSalary with a Constructor to initialize these members. Derive a subclass 'Salary' with members dearnessAllowance, houseRentAllowance, providentFund, insurance, grossSalary, netSalary. Define a Constructor to invoke the superclass Constructor. Define a method getNetSalary with the following Calculations: DearnessAllowance is 45% of basicSalary HouseRentAllowance is 7% of basicSalary ProvidentFund is 10% of basicSalary insurance is Rs. 640/- Write a main class to Demonstrate Single Level Inheritance.
2.	Write a java program to create package and to convert a list of temperatures in Fahrenheit to Celsius.
3.	Write a java program to create package and to calculate simple interest and the total amount.
4.	Write a java program to search for the string "India" in a list of given strings and convert it to "Bharath". If "India" is not exist in the list it should throw an exception called NO MATCH EXCEPTION.
5.	Write a java program with a try block that generates three types of exceptions .write proper catch blocks to handle the exception.
6.	Write a java program to generate multiplication table for any three given numbers using three different threads. Use different priorities.
7.	Write a java program to implement multiple inheritance.
8.	Design a class to represent a bank account. Include the following members :

	Data members • Name of the Depositor • Account number • Type of account • Balance amount in the account Methods • to assign initial values • to deposit an amount • to withdraw an amount after checking balance • to display the name and balance
9	JDBC Program for login validation

Scheme of Practical Examination;

Practical (Three hours of duration for 40 marks)

One question from Part A: 10 marks

One question from Part B : 20 marks

Record:5 marks, Viva – 5 Marks

OPEN ELECTIVE

III Semester

Skill Based Electives – 2 No.

1. Basics of Android Programming

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture**.** **(2 Hours)**

Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine. **(4 Hours)**

Development Tools: Installing and using android studio, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating

a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device**.** **(5 Hours**)

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes**.** **(2 Hours)**

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog**.** **(2 Hours)**

Database: Understanding of SQLite database, connecting with the database**.**

(2 Hours)

Book Recommended:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

ONLINE READING / SUPPORTING MATERIAL:

1. http://www.developer.android.com
2. http://developer.android.com/about/versions/index.html
3. http://developer.android.com/training/basics/firstapp/index.html
4. http://docs.oracle.com/javase/tutorial/index.htm

(Available in the form of free downloadable ebooks also).

5. http://developer.android.com/guide/components/activities.html
6. http://developer.android.com/guide/components/fundamentals.html
7. http://developer.android.com/guide/components/intents-filters.html.
8. http://developer.android.com/training/multiscreen/screensizes.html
9. http://developer.android.com/guide/topics/ui/controls.html
10. http://developer.android.com/guide/topics/ui/declaring-layout.html
11. http://developer.android.com/training/basics/data-storage/databases.html

Software Lab Based on Android Programming:

1. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the emulator. Also display “Hello World” in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-incharge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.
8. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

2. Computer Hardware and Maintenance

Basic networking concepts,

Network topologies: LAN, WAN, MAN, PAN, CAN. Networking Model-The OSI model TCP/ IP Model, Network adapters, introducing protocols, Cabling and troubleshooting.

(5 Hrs)

Introduction to various networking devices:

Routers, Switches, Modems, Hubs etc., Wired and Wireless technology **(5Hrs)**

Inside the PC:

Opening the PC and identification, Study of different blocks, Assembling and disassembling **(5Hrs)**

Network basic and configuration: Setting IP addresses, Sharing files and folders, Network troubleshooting, PING test, ipconfig etc. **(5Hrs)**

Introduction to servers and network security

Types of servers: Files servers, Email Servers, Proxy servers etc.

Basics of Internet and Intranet:

Types of Internet connections: Dialup, Broadband, Leased Line, Wi-Fi, Wi-Max, 2G, 3G, 4G, WWW, E-mails, Search Engines, Social Networking. Cloud application.Audio-video Conferencing.Voice over Internet Protocol (VOIP).Recovery and backup.Essential security measures. (**10Hrs)**

II B. Sc. - Computer Science (IV Semester- Paper 4)

G505.4- Relational Data Base Management System using ORACLE/MySQL

Objectives:

- To facilitate the creation of data structures which can store thousands of records in it also removes duplicity in data and allows access to multiple users.
- Course emphasizes on how to organize, maintain and retrieve efficiently, and effectively information from a DBMS.

Outcomes:

CO-1. Describe the fundamental elements of relational database management systems.

CO-2. Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.

CO-3. Design ER-models to represent simple database application scenarios

CO-4. Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.

CO-5. Improve the database design by normalization.

UNIT 1

Database System Concepts and Architecture, History of Database Systems, Database Systems versus File Systems, Data Abstraction, Data independence, Schemas and Instances, Data models, Database Languages, Database Users, DBA, Structure of Database Systems.

The database system environment, Centralized and Client/Server Architecture for DBMS, Classification of DBMS, Entity types, attributes, keys, relationships, relationship types, roles and structural constraints, Weak entity sets, Data Modeling using E-R Models.

12 Hours

UNIT II

Relational model: Basic Concepts of relational data model, Relational Algebra, Basic and additional operations of relational algebra. Simple queries using relational algebra..

Design theory of Relational Database:Introduction to Relational database design, Functional dependency, Normal forms based on Primary Keys. Normal forms (INF, 2NF,3NF and BCNF)

Basic structure of Oracle System**:** Database Structure and its manipulation in Oracle, Storage organization in Oracle.

12 Hours

UNIT III

Introduction to Transaction Control Language(TCL) – Commit, Roll Back , Save Point

Creation of Database**:** Creating, changing and dropping the tables. Integrity Constraints specification, maintaining reference integrity constraints, Data insertion, deletion and modification, Querying the database**:** Information retrieval using SELECT statement,

Various features of SELECT statement, Aggregate functions, ORDER BY clause, Working with expressions and sub queries Handling of multiple tables.

.12 Hours

UNIT IV

Views**:** Creation of views, modification, data insertion and limitations of views

PL/SQL Basics**:** Introduction, character set, reserve words, Block structure, Data types, Conditional statements, looping statements, procedures, functions, Cursors-Implicit and explicit cursors, cursor attributes, exceptions.

12 Hours

Text Books :

Fundamentals of Database Systems by Elmasri and Navathe Pearson Education AsiaPublication, 4lhedition(Chapter 1,2, 3.1 to 3.7,5,6,10, 17.1 to 17.3 19.1)

Commercial Application Development using Oracle D2k by Ivan Bayross, BPB Publications (Chapter 1,2,3,4,5,6)

Reference Books:

1 .SQL, PL/SQL The programming Language - Oracle by Ivan Bayross BPB

(L Programming by Scott Urman , Tata McGrawhill Edition'

Scheme of Theory Examination;

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART-A consists of 12 questions of 2 marks each. A student will select 10 questions.

2X10=20 Marks

PART-B consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G 505.4P: RDBMS LAB (Windows based)

CO-1. Students get practical knowledge on designing and creating relational database systems.

CO-2. Understand various advanced queries execution such as relational constraints, joins, set operations, aggregate functions, trigger views and embedded SQL.

CO-3. Use of various software to design and build ER Diagrams, UML, Flow chart for related database systems.

CO-4. Students will be able to design and implement database applications

CO-5. Students get practical knowledge on designing and creating relational database systems.

<table>
<tr><td>SL. No</td><td><u>V Semester BSC RDBMS & ORACLE</u></td></tr>
<tr><td></td><td>LIST OF PROGRAMS- PART A</td></tr>
<tr><td>1.</td><td>Create a table EMPLOYEE with the following columns:
<table>
<tr><td>COLUMN</td><td>DATA TYPE</td><td>CONSTRAINTS</td></tr>
<tr><td>ENO</td><td>NUMBER</td><td>NOT NULL AND PRIMARY KEY</td></tr>
<tr><td>ENAME</td><td>VARCHAR2</td><td>NOT NULL</td></tr>
<tr><td>DEPT</td><td>VARCHAR2</td><td>NOT NULL</td></tr>
<tr><td>BASIC</td><td>NUMBER</td><td>BASIC>=5000 AND BASIC<=45000</td></tr>
</table>
Insert minimum five records to the table
Alter the table to add the columns DA, HRA, PF, Net pay, IT. Calculate the DA,HRA,PF,IT,NETPAY as follows:
DA=80% of BASIC ,if BASIC<20000 else 70% of BASIC
HRA=10% of BASIC
NETPAY=BASIC+DA+HRA
PF=2% of NETPAY and IT=5% of NETPAY
<u>QUERIES:</u>
1. Display the details of all employees</td></tr>
</table>

2. DISPLAY the names of employees of computer science department.
3. Display the names of all employees in alphabetical order
4. Display the department of all employees who are getting maximum net pay
5. Display the names of all employees in decreasing order of their net pay
6. Display the details of all employees whose net pay between 15000 and 35000
7. Display the name and basic of employees whose name contains 'Kumar'
8. Display the names and basic of employees whose name ends wit h 'th'
9. Count the number of employees in each department

Delete all employees from Law department

2 Create table EMP_MASTER with following columns:

COLUMN	DATA TYPE	CONSTRAINTS
ENO	VARCHAR2	PRIMARY KEY ,NOT NULL , SHOULD BEGIN WITH 'E'
ENAME	VARCHAR2	NOTNULL
DEPTNO	NUMBER	NUMBER OF DIGITS SHOULD BE 2
JOB_TITLE	VARCHAR2	NOT NULL
SALARY	NUMBER	GREATER THAN 1000
COMMISSION	NUMBER	
JOIN_DATE	DATE	NOT NULL

QUERIES :

1. Count the number of different job in EMP_MASTER
2. Display the details of those mangers who are earning more than 2500
3. Display the names and salary of those employees who earn less than 1250 OR more than 1600
4. List the names of employees whose names are five character long
5. Display name ,job, department number ,salary, commission of employees who are working in department number 20, in ascending

order of salary

6. Determine which department , who have more than or equal to 2 people holding a particular job
7. Find all the department that have at least 2 clerks
8. Display emp number, dept number ,join date in the descending order of joining date and in the 'mm/dd/yy' format
9. List out highest paid employee in each department
10. Give all employees in department 30
11. who don't earn commission ,10% increase in salary and commission that is 15% of their salary

3 Create tables CLIENT_MASTER and SALES_ORDER with following columns

CLIENT_MASTER TABLE

COLUMN	DATA TYPE	CONSTRAINTS
CLENT_NO	VARCHAR2	PRIMARY KEY,NOT NULL AND SHOULD START WITH CHARACTER 'C'
NAME	VARCHAR2	SHOULD APPEAR IN UPPER CASE ONLY
ADDRESS1	VARCHAR2	NOT NULL
ADDRESS2	VARCHAR2	
CITY	VARCHAR2	SHOULD BELONG TO CITIES LIKE 'DELHI','BOMBAY','CALCUTTA','MADRAS'
STATE	VARCHAR2	NOT NULL
PIN CODE	NUMBER	
BALANCE DUE	NUMBER	

SALES ORDER TABLE

COLUMN	DATA TYPE	CONSTRAINTS
ORDER_NO	VARCHAR2	PRIMARY KEY,NOT NULL AND SHOULD START WITH 'O'
ORDER_DATE	DATE	

CLIENT_NO	VARCHAR2	FOREIGN KEY REFERENCES CLIENT_MASTER
DELIVERY_TYPE	CHAR	DELIVERY : PART (P)/FULL(F),DEFAULT 'F'
BILLED_YN	CHAR	BILLED : YES (Y)/ NO(N)
ORDER_STATUS	VARCHAR2	VALUE SHOULD BE IN 'IN PROCESS', 'FUL FILLED','BACK ORDER','CANCELED'

QUERIES :

1. List out the names of all client who stay in a city whose second letter is 'a'
2. List out all client whose balance due is greater than 10000
3. Find the names of client who have the balance due
4. List out all the order numbers and order date whose order status is not fulfilled
5. List all the information for the orders placed in the month of January
6. List all client names whose delivery_type is 'full' and not billed
7. List the names, city , and state of clients who are not in the state of Maharashtra
8. Retrieve all the orders placed by a client named 'IVAN' whose order status is in process
9. Retrieve the order numbers, client names and their order dates from the table. The order status should be displayed in 'yy/mm/dd' format and store in descending order
10. Find the client names that have placed order before the month of May 96

4

Create table EMP and DEPT with the following columns:

EMP table:

COLUMN	DATA TYPE	CONSTRAINT
SSN	NUMBER	PRIMARY KEY,NOT NULL
NAME	VARCHAR2	NOT NULL
BDATE	DATE	

SALARY	NUMBER	
MGRSSN	NUMBER	SHOULD BELONG TO SSN
DNO	NUMBER	NOT NULL,SHOULD REFER TO DNO OF DEPT TABLE

DEPT TABLE:

COLUMN	DATA TYPE	CONSTRAINT
DNO	NUMBER	PRIMARY KEY,NOT NULL
DNAME	VARCHAR2	NOT NULL
LOC	VARCHAR2	

QUERIES :

1. Retrieve name, salary and annual salary as "yearly salary" from the table.
2. Retrieve name ,salary and birth dates of employees drawing salary between 15000 and 30000
3. Retrieve the name and dept no. of employees who were born in month of January
4. Retrieve the name birth dates and salary from table with descending order of date
5. Retrieve deptno ,count the number of employees average salary and to find the total salary of employees in each dept.
6. Retrieve the dept no. and average of salary of employees working in dept no. 3
7. Display the employee names and dept names for which they work.
8. Display the name salary and dept name of all employees who are working for 'accounts' dept.
9. Display the name and salary of employee who earns more than 'Joy'.
10. Display the names of employees whose manager is same as the employee whose SSN =2222.

PART B

5.	write a PL/SQL program o accept a string and count the number of vowels in it and also check the given string is palindrome o not
6.	Write a PL/SQL program to calculate the age of a person (obtain the name and date of birth of a person from the base table)
7.	Write a PL/SQL program to generate Fibonacci numbers from 1 to N

8.	Write a PL/SQL program to generate prime numbers up to N
9.	Write a PL/SQL program to process a bank transaction. Whenever a request for withdrawal is issued, a check is made if there id sufficient fund in the account. If the fund is not available, it should print the message as "NO Sufficient fund".
10.	Write a PL/SQL program to accept the students names and their marks in 3 subjects from a base table and declare the result based on the following rules: a. if the student has scored below 35 in any subject he/ she is declared as FAIL b. if the student passes and total>=180 then declare the result as FIRST CLASS C. If the student passes and total >=150 and <180 then declare the result as second class d. If the student passes and total<120 then declare the result as THIRD CLASS Assume the record of 5 students. Crete an output which contain the name of the student, marks in 3 subjects, total mark and result in the following format: Reg No Name Subject1 subject2 subject3 total result
11.	An electricity company supplies electricity to four types o customers coded 1,2,3&4. The rate schedule for the customers is as shown in the table: Customer Code 1 2 2 3 3 4 Consumption any <1000 >=1000 <5000 >=5000 Rate per unit 2.50 2.75 3.40 4.50 5.00 6.50 Write a PL/SQL program to create an output file which contains all the above fields with total bill
12.	An electricity company supplies electricity to four of customers coded 1,2,3&4. The rate schedule for the customers is as shown in he table: Customer code 1 2 2 3 3 4 Consumption any <1000 >=1000 <5000 >=5000 Rate per unit 2.50 2.75 3.40 4.50 5.00 6.50 Write a PL/SQL program using Exceptions.
13.	Write a function to compute the factorial of a number and write a procedure o compute the value of ${}_nC_r$ which uses the factorial functions.
14.	Given the following tables item_master(item_no, name, stock, unit_price) and item_trans(item_no, quantity and trans_date). write a function to check whether the item exists in item_master. write a main program such that if the function

	returns a value 1, add a record to I tem_trans, otherwise display an error message.
15.	Cursor Program

Scheme of Practical Examination;

Practical (Two hours of duration for 40 marks)

One Program From Part A : 15 marks

One Program From Part B : 15 marks

Record: 5 Marks, Viva: 5 Marks

OPEN ELECTIVE

IV Semester

Interdisciplinary Elective

G 505.4E Office Automation (1 +1 Lab)

CO-1. After completion of the course, students would be able to documents, spreadsheets, make small presentations and would be acquainted with internet.

Introduction to open office/MS office/Libre office **(1 Hour)**

Word Processing: Formatting Text, Pages, Lists, Tables **(5Hours)**

Spreadsheets: Worksheets, Formatting data, creating charts and graphs, using formulas and functions, macros, Pivot Table **(5 Hours)**

Presentation Tools: Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations **(4Hours)**

Books Recommended:

1. SushilaMadan , Introduction to Essential tools,JBA,2009.

2. Anita Goel, Computer Fundamentals, Pearson, 2012

III B.Sc - Computer Science (V Semester- Paper 5)

G 505.5A1 - OPERATING SYSTEM AND LINUX

Objectives:

- Subject Demonstrates a knowledge of process control, threads, concurrency, memory management, scheduling.
- Introduction of shell programming prepare the students to work on Linux environment.

Outcomes:

CO-1. Identify the functionalities of OS and their categories.

CO-2. Evaluate multithread techniques and process scheduling algorithms.

CO-3. Demonstrate suitable techniques for resource management

CO-4. Evaluate file system allocation and memory management Techniques.

CO-5. Review the protection mechanisms in processing environment.

CO-6. Explore the case studies of Operating Systems in Linux platform.

UNIT I

Introduction

Operating Systems, User view, system view, Computer system organization, Computer System architecture, Operating system structure, Operating system Operations, Special purpose Systems, Computing Environments. Operating System Services, User operating system interface.

Process

Process Overview, Cooperating Process, Threads- Overview, Multithreading Models.

10 Hours

UNIT II

CPU Scheduling

Basic Concepts, Scheduling Criteria, Scheduling algorithms – First Come First Served (FCFS), Shortest Job First (SJF) and Round Robin (RR)

Process Synchronization

Background, The critical section problem, Semaphores, Classical Problems of Synchronization. **10 Hours**

UNIT III

Deadlocks

System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlocks Prevention, Deadlocks Avoidance,Deadlocks Detection, Recovery from Deadlocks.

Memory Management

Logical versus physical address space, Swapping, Contiguous Memory Allocation. Virtual Memory and Paging **10 Hours**

UNIT IV

LINUX

Introduction, Features Of Linux, Structure of Linux, Basic Linux commands for-working with files and directories, text editing, Shell Scripting- Shell Input and Output, Conditional statements- if, if… elif…else statements, Loops- for loop, while and until loop, break and continue, Functions.

10 Hours

Text Books

1. Operating System Concepts – 7th edition by Abraham Silberschartz and Peter Galvin, McGraw Hill 2000.
2. Unix- The complete reference – second edition – Tata McGraw Hill publication

Reference Books

1. Operating System Design and Implementation by Andrew S Tanenbaum – Prentice Hall India ,1990.
2. Operating System principles by Brinch Hansen .p., PHI.
3. Operating System by Milan Milenkovic., McGraw Hill.
4. Logical design of operating systems by Show. A., PHI..

Scheme of Theory Examination;

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART-A

Consists of 12 questions of 2 marks each. A student will select 10 questions.

(2X10=20 Marks)

PART-B

Consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G 505.5AP: SHELL PROGRAMMING USING LINUX

Practical List

Sl.NO	LIST OF PROGRAMS- PART A
1.	Write a shell program to and display n Fibonacci numbers
2.	Write a shell program to accept an integer find its reverse and sum. Also check for palindrome
3.	Write a shell program to accept n and find sum of the series 1!+2!+3!+….+n!
4.	Write a shell program to display prime numbers within the given range
5.	Write a shell program to display all natural numbers between two integers and find their sum.
6.	Write a shell program to find the largest among the set of integers
7.	Write a shell program to accept a word check whether it begins with lower case vowel or upper vowel, end with a digit or whether it is a 3 letter word.
8.	Write a shell program to display the perfect numbers in the given range
9.	Write a shell program to accept n integers and count number of +ves, -ves and zeros. Also find the sum of the positive numbers and negative numbers.

10.	Write a shell program to accept many characters and count individual vowels, digits , spaces, special characters and constants.
	PART B
11.	Write a shell program to accept student name and marks in 3 subject through command line arguments and find the total marks and grade.
12.	Write a menu driven program for the following a. renaming a file b. Display the current working directory c. List the users logged in d. Append the contents of a file to another file(display the message if the file doesn't exist in the directory.
13.	1. Write a shell program to accept your choice –d for delete and –c for copy through command line arguments(eg: for deletion : $sh filename –d file1) and check for the following: a. Check whether the given arguments are sufficient for the selected option. b. .Deleting file must be present in the current folder
14.	Write a shell program to accept many files through command line do the following to each file: a. If it is ordinary file, display the contents of the file. b. If it is a directory, count the number of files in it. c. File/Directory does not exist, display the proper message
15.	Write a menu Driven Shell script for the following a. List of directory having all the permission b. List the ordinary files with assigned permission. c. Assign execute permission to specified file for the owner or Group. d. Exit.

Scheme of Practical Examination;

Practical (Two hours of duration for 40 marks)

One Program From Part A: 10 marks

One Program From Part B: 20 marks

Record: 5 Marks, Viva: 5 Marks

III B.Sc - Computer Science (V Semester- Paper 5a2-ELECTIVE PAPER)

G 505.5A2 - PRINCIPLES OF TCP/IP

Objectives:

- Helps in understanding the concepts of TCP/IP Protocols, ports, sockets and data encapsulation.
- Describe the process of packet fragmentation and reassembly and also explain how basic routing works.

Outcomes:

CO-1. Identifies protocols and standards in the Internet.

CO-2. Describe the TCP/IP protocol suite.

CO-3. Defining subnetting and supernetting.

CO-4. Explain error reporting and query mechanism in the Internet.

CO-5. Describe process-to-process communication (UDP, TCP, and SCTP).

Unit 1

Evolution of open Networks, Layering of communication process, TCP/IP Layering, standardization,Internetworking Concept and Architectural Model, Internet Addresses. Link Layer Encapsulation, Physical addresses, IEEE & MACs. ARP – Operations, Cache & time outs.

RARP – Overview, Operations, Primary and Backup RARP Servers. **10 Hours**

Unit II

IP Routing Principles, Routing IP Datagrams, RIP, OSPF, HELLO, BGP, Trace route program, CIDR Subnetting, VLSM **10 Hours**

Unit III

UDP Header, UDP Checksum, Multiplexing, Demultiplexing& Ports, Maximum Datagram Size. Sliding Windows, TCP - Passive and Active Opens, RTT Estimation, TCP Connection Establishment and Termination, Delayed Acknowledgement and Nagles Algorithm, TCP Timers, Multicasting – IP Multicast Addresses, IGMP.

DNS – Basics, Resolution, Caching, DNS Message Format, TELNET Protocol, Rlogin – protocol. **10 Hours**

Unit IV

FTP – Protocol, Process Model. TFTP, NFS, SMTP – Protocol. POP, IMAP, MIME.

IPV6 – Features, Datagram format. **10 Hours**

Text Book:

Comer Douglas E**, Internetworking with TCP/IP** : Principles, Protocols, And Architecture, Vol. I,5th Edition, Phi Learning, 2010

Reference Books:

1. Peter Loshin, **TCP/IP Clearly Explained,** Elsevier India, 1999
2. Behrouz A. Forouzan, ***TCP/IP Protocol Suite***, 2nd Edition, Tata Mc-Grow-Hill publications, 2003

Scheme of Theory Examination;

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART-A

Consists of 12 questions of 2 marks each. A student will select 10 questions.

(2X10=20 Marks)

PART-B

Consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G 505.5AP: TCP/IP LAB

Part A

Simulations

Part B

Socket Programming

Scheme of Practical Examination;

Practical (Two hours of duration for 40 marks)

One Program From Part A: 10 marks

One Program From Part B: 20 marks

Record: 5 Marks, Viva: 5 Marks

III B.Sc - Computer Science (V Semester- Paper 5b1)

G505.5B1 - PYTHON PROGRAMMING

Objectives:

- Python is used for developing desktop GUI applications, websites and web applications.
- Introduction of object oriented as well as procedural oriented free and open source programming language.

Outcomes:

CO-1. Examine python syntax & semantics and be fluent in using flow Control functions.

CO-2. Demonstrate proficiency in handling strings and file systems in

Python.

CO-3. Create & run python programs using core data structures like Lists, dictionaries, tuples, and sets and use of REs.

CO-4. Interpret and apply the concepts of OOP.

CO-5. Programming and web services.

CO-6. Implement exemplary applications related to network

CO-7. Implement database applications in python.

UNIT 1

Python Programming Basics- First Program, Program Execution

Flow Control- Boolean values, Operators- Comparison operators, Boolean operators, Binary Boolean operators, Not operators. Flow control Statements- if, while, for, break, continue, range() function, importing modules.

Functions- def statements, return statements, none value, keyword arguments and print(), local and global scope global statement

Manipulating Strings- Working with Strings, String Methods, Indexing and Slicing Strings, The in and not in Operators with Strings, Useful String Methods,.

10 Hours

UNIT 2

Object Oriented concepts in Python- Object Oriented concepts**,** Objects, Python Scopes and Namespaces**,** Classes, Class Objects, Instance Objects, Method**,** Objects, Class and Instance Variables**,** Inheritance.

List Basics- List data type, working with List- Augmented assignment operators, methods, List-like types: Strings and tuples.

Dictionary Datatype- Dictionaries vs. Lists, The keys(), values(), and items() Methods, Checking Whether a Key or Value Exists in a Dictionary , The get() Method, The setdefault() Method, Pretty Printing.

Sets- Concept of Sets, creating, initializing and accessing the elements of Sets operation (Membership, union, intersection, difference, and symmetric difference**10 Hours**

UNIT 3

Exception Handling- Errors and Exceptions- Syntax Errors, Exceptions, Handling Exceptions,

Raising Exceptions, User-defined Exceptions, Defining Clean-up Actions(try - finally), Predefined Clean-up Actions

Reading and writing files- Files and File Paths, The os.path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the pprint.pformat() Function, **10 Hours**

UNIT 4

Python database application programmer's interface (DB- API), connection and cursor objects, Type objects and constructors, python database adapters. Creating simple web clients, Python web application frameworks.

Web Scraping – **Urllib3:** Making requests, Response content, Request data, Timeouts, Errors & Exceptions.

Beautiful Soup: Introduction to Beautiful Soup, Beautiful Soup Objects, Navigating the BeautifulSoup object, Filters in the BeautifulSoup object, String, regular expression, list, function, Modifying the BeautifulSoup object **10 Hours**

Text Books

- Downey, A., Elkner, J., & Meyers, C. (2002). How to think like a computer scientist: learning with python. Green Tea Press, Wellesley, Massachusetts.
- Campbell, J., Gries, P., Montojo, J., & Wilson, G. (2013). Practical programming: an introduction to computer science using Python. Pragmatic Bookshelf, Second Edition

Reference Books

- T. Budd, Exploring Python, TMH, 1st Ed, 2011
- https://docs.python.org
- Learning Python By Mark Lutz,O'Reilly Publication
- Programming with python, A users Book, Michael Dawson, Cengage Learning
- Python Essential Reference, David Beazley, Third Edition
- Python Bible
- Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, CengageLearning,
- Magnus Lie Hetland, Beginning Python from Novice to Professional, Second Edition.
- Mark Summerfield, Programming in Python 3 - A Complete Introduction to the Python
  Language, Second Edition.
- Y. Daniel Liang, "Introduction to Programming Using Python", PearsonChun, J Wesley, Core Python Programming, 2nd Edition, Pearson, 2007 Reprint 2010.
- David Beazley and Brian K. Jones, Python Cookbook, Third Edition, Shroff Publishers
  & Distributors Pvt. Ltd.
- Mark Lutz, Learning Python FIFTH EDITION Mark Lutz.
- Mark Lutz, Programming Python (English) 4th Edition.
- Testing Python, David Sale, Wiley India (P) Ltd.,

Scheme of Theory Examination:

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART A-

Two mark questions – 10/12

Equal weightage should be given to each unit. **20 Marks**

PART-B consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G 505.5BP: PYTHON PROGRAMMING LAB

[List of Programs; can select from this list]

1. Simple Python Programs

Python Program to Calculate the Average of Numbers in a Given List

Python Program to Exchange the Values of Two Numbers Without Using a Temporary Variable

Python Program to Read a Number n and Compute n+nn+nnn

Python Program to Reverse a Given Number

Python Program to Check Whether a Number is Positive or Negative

Python Program to Take in the Marks of 5 Subjects and Display the Grade

Python Program to Print all Numbers in a Range Divisible by a Given Number

Python Program to Read Two Numbers and Print Their Quotient and Remainder

Python Program to Accept Three Digits and Print all Possible Combinations from the Digits

Python Program to Print Odd Numbers Within a Given Range

Python Program to Find the Sum of Digits in a Number

Python Program to Find the Smallest Divisor of an Integer

Python Program to Count the Number of Digits in a Number

Python Program to Check if a Number is a Palindrome

Python Program to Print all Integers that Aren't Divisible by Either 2 or 3 and Lie between 1 and 50.

Python Program to Read a Number n And Print the Series "1+2+…..+n= "

Python Program to Print an Identity Matrix

Python Program to Compute Simple Interest Given all the Required Values

Python Program to Check Whether a Given Year is a Leap Year

Python Program to Read Height in Centimeters and then Convert the Height to Feet and Inches

Python Program to Take the Temperature in Celcius and Covert it to Farenheit

Python Program to Compute Prime Factors of an Integer

Python Program to Generate all the Divisors of an Integer

Python Program to Print Table of a Given Number

Python Program to Print Sum of Negative Numbers, Positive Even Numbers and Positive Odd numbers in a List

Python Program to Print Largest Even and Largest Odd Number in a List

Python Program to Find Those Numbers which are Divisible by 7 and Multiple of 5 in a Given Range of Numbers

Python Program to Check if a Number is an Armstrong Number

Python Program to Print the Pascal's triangle for n number of rows given by the user

Python Program to Check if a Number is a Perfect Number

Python Program to Check if a Number is a Strong Number

Python Program to Find the LCM of Two Numbers

Python Program to Find the GCD of Two Numbers

Python Program to Find the Area of a Triangle Given All Three Sides

Python Program to Check if a Number is a Prime Number

Python Program to Print all the Prime Numbers within a Given Range

Python Program to Print Numbers in a Range (1,upper) Without Using any Loops

Python Program to Find the Sum of Sine Series

Python Program to Find the Sum of Cosine Series

Python Program to Find the Sum of First N Natural Numbers

Python Program to Find the Sum of the Series: 1 + 1/2 + 1/3 + ….. + 1/N

Python Program to Find the Sum of the Series: 1 + x^2/2 + x^3/3 + … x^n/n

Python Program to Compute the Value of Euler's Number e. Use the Formula: e = 1 + 1/1! + 1/2! + …… 1/n!

Python Program to Search the Number of Times a Particular Number Occurs in a List

Python Program to Find Whether a Number is a Power of Two

2. Python Programs on Lists

Python Program to Find the Largest Number in a List

Python Program to Find the Second Largest Number in a List

Python Program to Put Even and Odd elements in a List into Two Different Lists

Python Program to Merge Two Lists and Sort it

Python Program to Sort the List According to the Second Element in Sublist

Python Program to Find the Second Largest Number in a List Using Bubble Sort

Python Program to Sort a List According to the Length of the Elements
Python Program to Find the Union of two Lists
Python Program to Find the Intersection of Two Lists
Python Program to Create a List of Tuples with the First Element as the Number and Second Element as the Square of the Number
Python Program to Find all Numbers in a Range which are Perfect Squares and Sum of all Digits in the Number is Less than 10
Python Program to Swap the First and Last Value of a List
Python Program to Remove the Duplicate Items from a List
Python Program to Read a List of Words and Return the Length of the Longest One
Python Program to Remove the ith Occurrence of the Given Word in a List where Words can Repeat

3. Python Programming Examples on Strings

Python Program to Replace all Occurrences of 'a' with $ in a String
Python Program to Remove the nth Index Character from a Non-Empty String
Python Program to Form a New String where the First Character and the Last Character have been Exchanged
Python Program to Count the Number of Vowels in a String
Python Program to Take in a String and Replace Every Blank Space with Hyphen
Python Program to Calculate the Length of a String Without Using a Library Function
Python Program to Remove the Characters of Odd Index Values in a String
Python Program to Calculate the Number of Words and the Number of Characters Present in a String
Python Program to Take in Two Strings and Display the Larger String without Using Built-in Functions
Python Program to Count Number of Lowercase Characters in a String
Python Program to Check if a String is a Palindrome or Not
Python Program to Calculate the Number of Upper Case Letters and Lower Case Letters in a String
Python Program to Check if a String is a Pangram or Not
Python Program to Accept a Hyphen Separated Sequence of Words as Input and Print the Words in a Hyphen-Separated Sequence after Sorting them Alphabetically

Python Program to Calculate the Number of Digits and Letters in a String

Python Program to Form a New String Made of the First 2 and Last 2 characters From a Given String

Python Program to Count the Occurrences of Each Word in a Given String Sentence

Python Program to Check if a Substring is Present in a Given String

4. Python Programming Examples on Dictionary

Python Program to Add a Key-Value Pair to the Dictionary

Python Program to Concatenate Two Dictionaries Into One

Python Program to Check if a Given Key Exists in a Dictionary or Not

Python Program to Generate a Dictionary that Contains Numbers (between 1 and n) in the Form (x,x*x).

Python Program to Sum All the Items in a Dictionary

Python Program to Multiply All the Items in a Dictionary

Python Program to Remove the Given Key from a Dictionary

Python Program to Form a Dictionary from an Object of a Class

Python Program to Map Two Lists into a Dictionary

Python Program to Count the Frequency of Words Appearing in a String Using a Dictionary

Python Program to Create a Dictionary with Key as First Character and Value as Words Starting with that Character

5. Python Programming Examples on Sets

Python Program to Count the Number of Vowels Present in a String using Sets

Python Program to Check Common Letters in Two Input Strings

Python Program that Displays which Letters are in the First String but not in the Second

Python Program that Displays which Letters are Present in Both the Strings

Python Program that Displays which Letters are in the Two Strings but not in Both

6. Python Programs on File Handling

Python Program to Read the Contents of a File

Python Program to Count the Number of Words in a Text File

Python Program to Count the Number of Lines in a Text File

Python Program to Read a String from the User and Append it into a File

Python Program to Count the Occurrences of a Word in a Text File
Python Program to Copy the Contents of One File into Another
Python Program that Reads a Text File and Counts the Number of Times a Certain Letter Appears in the Text File
Python Program to Read a Text File and Print all the Numbers Present in the Text File
Python Program to Append the Contents of One File to Another File
Python Program to Count the Number of Blank Spaces in a Text File
Python Program to Read a File and Capitalize the First Letter of Every Word in the File
Python Program to Read the Contents of a File in Reverse Order

7. Python Programs on Classes, objects, Exception Handling, Operator overloading, Inheritance

Python program to demonstrate operator overloading
Python program to demonstrate different types of inheritances
Python program to demonstrate user defined exceptions

8. Python Programs on GUI and Database Connection

Python program to demonstrate Employee and Student database
Python Programs to demonstrate working of different controls of tkinter(like label, buttob, text, entry, menu, checkboxes etc)
Python Program to demonstrate connecting GUI and database
(example: create GUI to read employee details, store the records in database and retrieve the records and display them on screen or GUI)

Suggested Practical List

Section: A (Simple programs)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :

Grade A: Percentage >=80

Grade B: Percentage>=70 and <80

Grade C: Percentage>=60 and <70

Grade D: Percentage>=40 and <60

Grade E: Percentage<40

3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.

4. WAP to display the first n terms of Fibonacci series.

5. WAP to find factorial of the given number. 6. WAP to find sum of the following series for n terms: 1 – 2/2! + 3/3! - - - - - n/n!

6. WAP to calculate the sum and product of two compatible matrices.

Section: B

Programmes on Web Scraping

III B.Sc - Computer Science (V Semester- Paper 5b2-ELECTIVE PAPER)

G505.5B2 - JAVA 2 ENTERPRISE EDITION

Objectives:

- To provide the necessary knowledge to design and develop dynamic database driven application
- Create Web applications using Java Servlets and manage Web session using Servlet and JSP

Outcomes:

CO-1. After the completion of this course, the students will be able to develop a small project independently

UNIT - 1

Introducing J2EE

Need for Enterprise Programming, The J2EE Advantage: Platform Independence, Managed Objects, Reusability, Modularity, Enterprise Architecture Types: Single – Tier Systems, 2- tier Architecture, 3- Tier Architecture, n-Tier Architecture, Architecture of J2EE, Introducing J2EE Components: J2EE Runtime, J2EE APIs

Introducing J2EE Containers

Containers and Services, Types of J2EE Technologies: Introducing J2EE Component Technologies, Introducing J2EE Service Technologies, Introducing J2EE Communication Technologies, Fitting Components.

10 HOURS

UNIT - 2

Java Database Connectivity

Introducing to ODBC, Defining ODBC, ODBC Components, ODBC Architecture, Introducing JDBC, JDBC Components, JDBC Features, JDBC Architecture, JDBC Drivers, JDBC API, Classes and Interfacesin JBC API, Creating DSN, Implementing JDBC Statements and Resultsets,

JDBC Statements, working with stmt interface, Docking with prepared stmt interface, Comparison between stmt $ prepared stmt, Advantages and disadvantages between prepared stmt, working with resultset and resultset metadata. **10 HOURS**

UNIT - 3

Java Servlets:

Life cycle of servlets,Java Servlets and common Gateway Interface Programming, Benefits of Using a Java Servlet, A Simple Java Servlet, Anatomy of Java Servlet, Deployment Descriptor, Reading Data from a client, Reading HTTP Request Headers, Sending Data to a client and Writing the HTTP Response Header, Working with cookies, Tracking Sessions.

10 HOURS

UNIT - 4

Java Server Pages:

JSP, Installation, JSP Tags, Overview of java syntax, statements,Variable and Objects, Methods, Control Statements, Loops, Tomcat, Request string, Parsing other information, Using Sessions, cookies, Session Objects.

Introducing Enterprise Java Beans (Theory Only)

Enterprise JavaBeans, the EJB Container, EJB Classes, EJB Interfaces, Deployment Descriptors, Referencing EJB, Reference Other Resources, Sharing Resources, Session Java Bean – Stateless vs. Stateful, Creating a Session Java Bean, Entity Java Bean, Container - Managed Persistence.

10 HOURS

Text Books

1. Java Server Programming, J2EE 1.4 Edition, Black Book, Dreamtech Software Team (Unit I)
2. The Complete Reference, Jim Keogh (Unit II: Unit III & Unit IV)

Reference Books

1. Mukhar Kevin and Weaver L James, Beginning J2EE 1.4, Wrox Press Ltd.
2. Bergster Hans, Java Server Pages, O'Reilly and Associates Inc
3. Valesky Tom, Enterprise JavaBeans, Pearson Education Asia
4. Hunter Jason, Crawford William, Java Servlet Programming, O'Reilly and Associates Inc

Scheme of Theory Examination:

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART A-

Two mark questions – 10/12

Equal weightage should be given to each unit. **20 Marks**

PART-B consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G505.5 BP: J2EE LAB (Linux Based)

PART-A(Simple JSP /Servelet Programs)

1. Write a Java Server Page program to design a student's application form and post the data to the next page and display it.
   i. **First Name** - (Text Box)
   ii. **Last Name** (Text Box)
   iii. **Date of birth** Combo Box
   iv. **Address** (Text area)
   v. **Gender** (Radio buttons)

vi. **Course Opted** (Combo box – BA, BCom, BSW,)
vii. **School Studied** (Text Box)
viii. **Percentage Obtained** :(text Box) numbers only
ix. **Hobbies** – Check Boxes

2. Write a JSP program to validate the Login Form. If the username and password are matching then forward the control to the Welcome page or to the Error Page. Use same header format for all the pages.
3. Write a JSP Program to design a shopping cart to add items, remove item and to display items from the cart using Sessions
4. Write a Servlet Program to read the System Time and greet the User and change the background color according to the users option
5. Write a Servlet Program to Design a Shopping Page and to display the data
6. Write a Servlet Program to create a session and display session details
7. Write a Servlet Program to find the new user and the Repeated User of the web site using Cookies

PART A (JSP/Servelet Programs(with Datatbase Connection)

8. Write a JSP Program to implement an Online Examination
9. Create a JSP page that Displays student list from student table. It should display all the student names in a table and the names should be hyperlinks. If you click on a student name, the respective student details should be displayed.
10. Write a Servlet Program to perform Insert Delete and View operations on Employee Table
11. Write a program to authenticate the Login Form

PART B (JDBC Program)

12. Write a JDBC program to perform the following operations on a Book table of Library database(Book_Id, Book_Title, Book_Author, Publication, Book_Price, Book_Copies)

MENU

1. Add a New Book
2. Delete a Specifies Book
3. Update the Book Info

a. Book Price
b. No of Copies

4. Exit

13. Write a JDBC Program to perform the following Operations on Bank Database

Customer data base with following fields- Acc_No, Cust_Name, Cust_Address, Acc_Type, Balance.

Transaction data base with following fields:(Acc_No, Trans_Date, Trans_Type, Particulars, Trans_Amt.

MENU

1. Deposit
2. Withdraw
3. Report
    a. Daily Report
    b. Periodical Report for a specified Customer
4. Exit

Hints:

- Assume that Customer table contains the date already
- *Validate the Account number for each transaction
- *For each transaction a new record should be inserted into the transaction table and Amount (total amount) should be updated in the Customer table.

14. Write a JDBC program to perform the following operations on the student table.

Student database-(StRegNo, StName, Stdob, StAddress, StClass, StCourse)

MENU

1. Add new Student
2. Delete a specified students Record
3. Update Students Address
4. Search f or a particular Student
5. Exit

15. Write a JDBC Program to Read Marks and calculate the Result. Save the information into the table and display the Result using Join (Student) table.

Examination- RegNo, Subject1, Subject2, Subejct3, Total, Percentage, Result

16. Write a menu driven JDBC program to perform the following operations on the Employee table(EmpId, EmpName, EmpDept, EmpSalary)

MENU

1. Add a new Employee
2. Delete a specified Employee
3. View
    a. Display the count of employee and total salary for each department.
4. Update all the employee's salary by a specified amount

17. Refer the above Employee table. Calculate the DA, HRA, PF, Net Salary and Gross Salary for all the employees. Create a new table called Salary and save all the data into it. Display a specified Employees Salary Slip. (Use Join Tables)

Scheme of Practical Examination;

Practical Max.Marks : 40

One Program from Part A-10 Marks

One Program from Part B - 20 Marks

Record: 5 Marks, Viva - 5 Marks

III B. Sc. - Computer Science (VI Semester- Paper 7)

G505.6A1 - DATA ANALYTICS

Course objectives;

Exploring the various data analytics techniques to solve problems in business & computing world. Understanding Text mining, web mining & social network analysis, learning Bigdata, Business intelligence and their applications and to become familiarized with data mining, Text mining, web mining & social network analysis

Establish an efficient scientific computing environment, identify and use available R packages and associated Open Source software to meet given scientific objectives, design and write efficient programs using R (and similar high-level languages) to

perform routine and specialized data manipulation/management and analysis tasks, document analytical workflow using R, markdown languages, and version control

Outcomes:

CO-1. Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications.

CO-2. Ability to select and implement machine learning techniques and computing environment that are suitable for the applications under consideration.

CO-3.

Ability to solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues.

CO-4.

Ability to understand and apply scaling up machine learning techniques and associated computing techniques and technologies.

CO-5. Ability to visualize data through various forms.

UNIT 1

Wholeness of Data Analytics, Business Intelligence, Pattern Recognition , Data Processing Chain-Data, Database, Data Warehouse, Data Mining, Data Visualization

Business Intelligence Concepts and Applications: BI for better decisions, Decision types, BI Tools, BI Skills, BI Applications

Data Warehousing: Design Considerations for DW, DW Development Approaches, DW Architecture, Data Sources, Data Loading Processes, Data Warehouse Design, DW Access, DW Best Practices

Data Mining ::Gathering and selecting data , Data cleansing and preparation , Outputs of Data Mining, Evaluating Data Mining Results , Data Mining Techniques , Tools and Platforms for Data Mining, Data Mining Best Practices, Myths about data mining , Data Mining Mistakes

Data Visualization Excellence in Visualization, Types of Charts, Visualization Example

10 Hours

UNIT II

History and overview of R, Basic language elements and data structures. Data input/output, Data storage formats. Subsetting objects .Vectorization. Control structures. Functions.Scoping Rules. Loop functions. Graphics and visualization.

10 Hours

UNIT III

Decision Trees: Decision Tree problem, Decision Tree Construction, Lessons from constructing trees, Decision Tree Algorithms

Regression :: Correlations and Relationships , Visual look at relationships , Regression Exercise , Non-linear regression exercise , Logistic Regression , Advantages and Disadvantages of Regression Models

Artificial Neural Networks, Business Applications of ANN, Design Principles of an Artificial Neural Network, Representation of a Neural Network, Architecting a Neural Network, Developing an ANN, Advantages and Disadvantages of using ANNs

Cluster Analysis: Caselet: Cluster Analysis, Applications of Cluster Analysis, Definition of a Cluster, Representing clusters, Clustering techniques, Clustering Exercise, K-Means Algorithm for clustering, Selecting the number of clusters, Advantages and Disadvantages of K-Means algorithm.

10 Hours

UNIT IV

Text Mining: Text Mining Applications, Text Mining Process, Term Document Matrix, Mining the TDM, Comparing Text Mining and Data Mining, Text Mining Best Practices

Web Mining: Web content mining, Web structure mining, Web usage mining, Web Mining Algorithms

Social Network Analysis: Techniques and algorithms, page rank, practical considerations

Big Data: Defining Big Data, Big Data Landscape, Business Implications of Big Data, Technology Implications of Big Data, Big Data Technologies, Management of Big Data

Data Modeling Primer: Evolution of data management systems, Relational Data Model , Implementing the Relational Data Model , Database management systems (DBMS) , Structured Query Language

10 Hours

Text Book:

Data Analytics, Anil Maheshwari, McGraw Hill Education (India) Private Limited, 2017

Reference Books

1) Richard Cotton, "Learning R", O'Reilly, 2013.
2) Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data , EMC2 Education Services
3) Real-Time Big Data Analytics: Emerging Architecture Kindle Edition by Mike Barlow
4) Data Analytics: Applicable Data Analysis to Advance Any Business Using the Power of Data Driven Analytics,Jeff Reed
5) Data Analytics for Beginners: A Beginner's Guide to Learn and Master Data Analytics , **Robert J. Woz**
6) W. N. Venables, D. M. Smith, An Introduction to R, R-core team,2015

Scheme of Theory Examination:

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART A-

Two mark questions – 10/12

Equal weightage should be given to each unit. **20 Marks**

PART-B consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G505.6AP DATA ANALYTICS LAB (R PROGRAMMING LAB)

Suggestive only

1. Write a program that prints 'Hello World' to the screen.

2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n

3. Write a program that prints a multiplication table for numbers up to 12.

4. Write a function that returns the largest element in a list.

5. Write a function that computes the running total of a list.

6. Write a function that tests whether a string is a palindrome.

7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort

8. Implement linear search.

9. Implement binary search.

10. Implement matrices addition, subtraction and Multiplication

Scheme of Examination for Practical

Practical Max. Marks: 40

One Program from Part A -10 Marks

One Program from Part B-20 Marks

Record: 5 Marks, Viva: 5 Marks

III B. Sc. - Computer Science (VI Semester- Paper 8b-ELECTIVE PAPER)

G505.6 A2 – SOFTWARE ENGINEERING AND TESTING

Objectives:

- Helps in developing the ability to design a system, component or process.
- Better and in-depth understanding about how to develop and create a piece of software.

Outcomes:

CO-1. Assess professional and ethical responsibility, software engineering principles and activities involved in building large software programs.

CO-2. Demonstrate process of requirements gathering, classification, Specification & validation.

CO-3. Design models for software system, component and process

Within realistic constraints.

CO-4. Apply cost estimation and time scheduling for quality project

Activities.

CO-5. Apply, design, implement, verify, validate and maintain software

Systems with metrics.

UNIT I

Introduction:

Introduction to software, Types of software, classes of software, introduction to software engineering, software components, characteristics, software engineering processes, some terminologies.

Software Development Life Cycle Models:

Software development life cycle, waterfall model, prototyping model, spiral model, evolutionary development model, Iterative enhancement model. **10 HOURS**

UNIT II

Introduction to software requirement specification:

Types of Requirement: Requirement engineering task, process of requirement engineering, information modeling, data flow diagram, decision table, SRS document, SRS validation, components of SRS, characteristics of SRS.

Software reliability and quality Assurance:

Verification and validation, Software Quality assurance, capability maturity model, Reliability Issues, Metrics. **10 HOURS**

UNIT III

System Design:

System/Software Design, Architectural Design, Low level design, coupling and cohesion, functional versus Object- Oriented Approach, Design Specification, Verification for design, monitoring and control for design.

Coding:

Information Hiding, Programming Style, Internal Documentation, Monitoring and control for coding, Structural Programming. **10 HOURS**

UNIT IV

Software Testing:

Basics of Software Testing, Basic Principles, Test case selection and Adequacy Humans, Errors and Testing, Software Quality; Requirements, Behavior and Correctness, Correctness Vs Reliability; Testing and Debugging; A perspective on Testing, Examples Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Level of testing. Example.

Boundary value testing, Equivalence class testing, Decision table based testing:

Boundary value analysis, Robustness testing, Worst-case testing, special value testing, Examples, Random testing, Equivalence classes, Guidelines and observations, Decision tables. **10 HOURS**

Text Book

1.Software Engineering by KK Aggarwal, New Age International

2. Adithya P. Mathur " Foundations of Software Testing – Fundamental Algorithms and Techniques", Pearson Education India, 2011

Reference Books

- Integrated Approach to Software Engineering by PankajJalote
- An Integrated Approach to Software Engineering by Pressmann, McGraw Hill
- Software Engineering by lanSommerville, PEARSON
- KshirasagaraNaik, PriyadarshiTripathy: Software Testing and Quality Assurance, Wiley India 2012

Scheme of Theory Examination:

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART A-

Two mark questions – 10/12

Equal weightage should be given to each unit. **20 Marks**

PART-B consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G505.6AP: SOFTWARE ENGENEERING LAB

Lab based on Software Engineering

1. Practical Title
   - Problem Statement,
   - Process Model
2. Requirement Analysis
   - Creating a Data Flow
   - Data Dictionary, Use Cases
3. Project Management
   - Computing FP
   - Effort
   - Schedule, Risk Table, Timeline chart
4. Design Engineering
   - Architectural Design
   - Data Design, Component Level Design
5. Testing
   - Unit and module Testing
     - Designing of Equivalence Test cases
     - Level of Testing
     - Designing of Test Classes

LAB EXERCISES

1. Select a Test case of the student's Choice
2. Select the Title and Define the Problem for the selected Test Case
3. Analyze the requirements of the proposed problem.
4. Prepare the SRS Document for the defined problem.
5. Draw the Data flow diagram.
6. Draw the ER Diagram for the proposed problem.
7. Design the database and the table structure for the proposed system.
8. Draw the user interface for the system.
9. Prepare the test cases for the system.

10. Perform the possible tests.

Sample Projects

- Level of testing, Examples: Generalized pseudo code, The triangle problem, the Next Date function, The commission problem
- Equivalence test cases for triangle problem, Next Date function and commission problem
- DTC Route Information: Online information about the bus routes and their frequency and fares
- Car Pooling: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
- Patient Appointment and Prescription Management System
- Organized Retail Shopping Management Software
- Parking Allocation System
- Wholesale Management System
- Criminal Record Management: Implement a criminal record management system for jailers, police officers and CBI officers
- Online Hotel Reservation Service System
- Examination and Result computation system
- Automatic Internal Assessment System

Scheme of Examination for Practical

Practical Max. Marks: 40

Case Study

SRS, SDD ,Test cases (10 marks each)

Record: 5 Marks, Viva: 5 Marks

III B.Sc. - Computer Science (VI Semester- Paper 8)

G505.6B1 – Web Programming Using PHP

Objectives:

- Helps to understand how server side programming works on the web.
- PHP is used to develop Static Websites or Dynamic websites or Web applications.

Outcomes:

CO-1. Describe fundamentals of web

CO-2. Introduce the creation of static webpage using HTML

CO-3. Describe the importance of CSS in web development

CO-4. Describe the function of JavaScript as a dynamic webpage creating tool

CO-5. Distinguish PHP as a server side programming language

UNIT – 1

Introduction to World Wide Web Concepts:-www, web server, web browser, internet, Electronic Mail, Introduction to HTML and Web Page authoring using HTML,HTML basic tags.

Style Sheets:- Style Sheets basics, Adding style to a document – Linking to a Style Sheets, Embedding and importing Style Sheets, Using in –line styles, Using classes and Ids, Style Sheets properties – Font, Text, Color, etc. **10 HOURS**

UNIT – 2

Introducing PHP:-History, unique features, basic development concepts, creating first PHP script, escaping special characters.

Using variables and operators:-Storing data in variables, understanding PHP data types, setting and checking variable data types; Using constants, manipulating variables with operators, handling form inputs.

Controlling program flow:-Writing conditional statements, repeating actions with loops, working with strings and numeric functions. **10 HOURS**

UNIT – 3

Working with arrays: Storing data in arrays, processing arrays with loops and iterators, working with array functions. Working with date and time

Using functions:-Creating user defined functions.

Working with data bases and SQL:-Introducing data bases and SQL, creating the data base. **10 HOURS**

UNIT – 4

Manipulation of data base: Adding or modifying data, using php's My SQL extension, Working with cookies, sessions

Handling errors:-Handling script errors, exceptions, validating form inputs.

Securing PHP:-Sanitizing input and output. Validating user input **10 HOURS**

Text Books

PHP: A BEGINNER'S GUIDE by VikramVaswani

Reference Books

1. Web Technologies: HTML, Javascript, PHP, Java, JSP, XML, and AJAX, Black Book (New)by Kogent Learning Solutions Inc
2. PHP: The Good Parts: Delivering the Best of PHPby Peter MacIntyre
3. Beginning PHP 5.3by Matt Doyle

Scheme of Theory Examination:

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART A-

Two mark questions – 10/12

Equal weightage should be given to each unit. **20 Marks**

PART-B consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G505.6BP: PHP Lab

CO-1. Write PHP scripts to handle HTML forms.

CO-2. Write regular expressions including modifiers, operators, and meta characters.

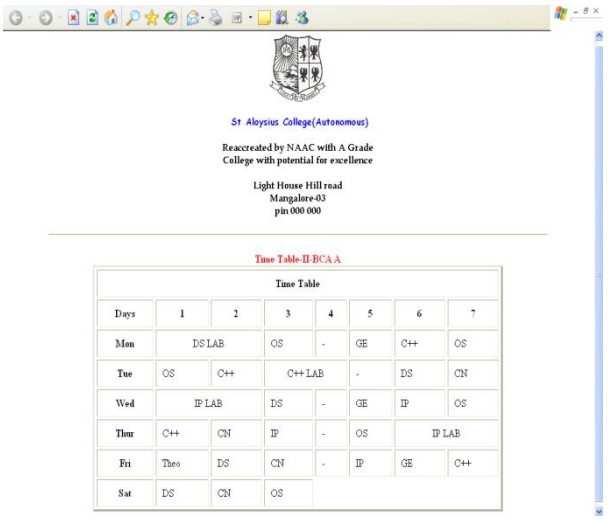
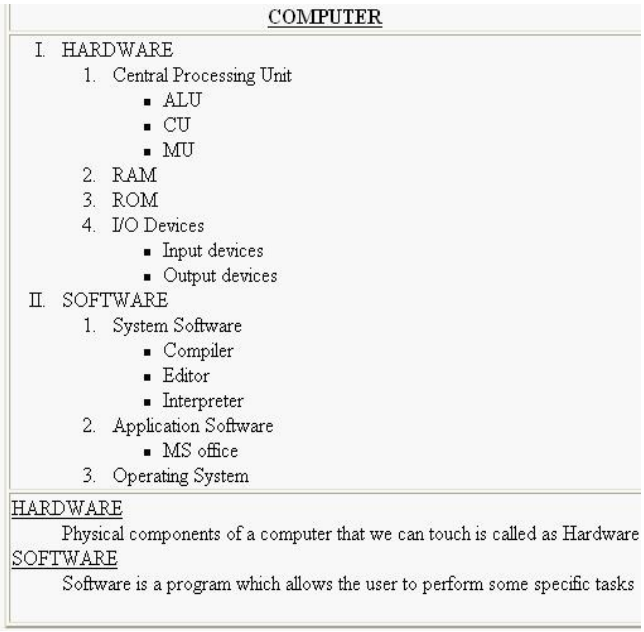
CO-3. Analyze and solve various database tasks Using PHP language.

CO-4. Analyze and solve common Web application tasks by Writing PHP programs.

(Windows Based)

Practical List

WEB PROGRAMMING LAB INDEX		
SL. NO	**PART-A - EXERCISES ON HTML**	Page No

1	**Create a webpage using HTML to design your class TIMETABLE** 	
2	Exercise on Ordered list, Unordered list and definition list. Design the Following: 	

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Time Table-II-BCA A

Time Table							
Days	1	2	3	4	5	6	7
Mon	DS LAB		OS	-	GE	C++	OS
Tue	OS	C++	C++ LAB		-	DS	CN
Wed	IP LAB		DS	-	GE	IP	OS
Thur	C++	CN	IP	-	OS	IP LAB	
Fri	Theo	DS	CN	-	IP	GE	C++
Sat	DS	CN	OS				

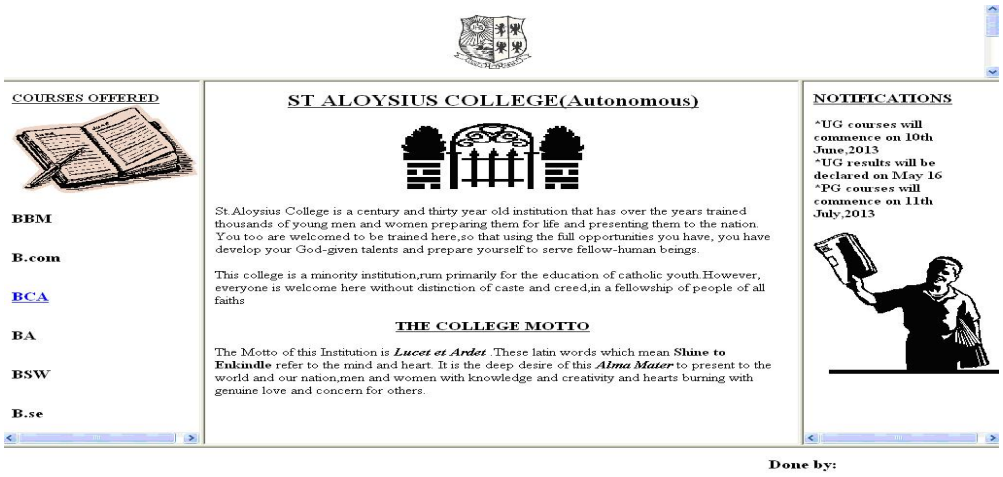
COMPUTER

I. HARDWARE
   1. Central Processing Unit
      - ALU
      - CU
      - MU
   2. RAM
   3. ROM
   4. I/O Devices
      - Input devices
      - Output devices

II. SOFTWARE
   1. System Software
      - Compiler
      - Editor
      - Interpreter
   2. Application Software
      - MS office
   3. Operating System

HARDWARE
Physical components of a computer that we can touch is called as Hardware

SOFTWARE
Software is a program which allows the user to perform some specific tasks

3.	Using frames design a college website using following format.  COURSES OFFERED BBM B.com BCA BA BSW B.se ST ALOYSIUS COLLEGE(Autonomous) St.Aloysius College is a century and thirty year old institution that has over the years trained thousands of young men and women preparing them for life and presenting them to the nation. You too are welcomed to be trained here,so that using the full opportunities you have, you have develop your God-given talents and prepare yourself to serve fellow-human beings. This college is a minority institution,rum primarily for the education of catholic youth.However, everyone is welcome here without distinction of caste and creed,in a fellowship of people of all faiths THE COLLEGE MOTTO The Motto of this Institution is ***Lucet et Ardet*** .These latin words which mean **Shine to Enkindle** refer to the mind and heart. It is the deep desire of this ***Alma Mater*** to present to the world and our nation,men and women with knowledge and creativity and hearts burning with genuine love and concern for others. NOTIFICATIONS *UG courses will commence on 10th June,2013 *UG results will be declared on May 16 *PG courses will commence on 11th July,2013 Done by:	
4	Design a web page on Tourism Places In Mangalore using hyperlinks of type1 and type2.	
5	Using Html design Job Application form. Job Application Form Name: First Name Middle Name Last Name DOB: 1 JAN 1994 Sex: M F Address: Qualifications: Percentage Of Marks: Wheather you have working experience Yes No	

6	Design the following web page using inline, embedded and external style sheets.  	
7.	Write a PHP program to process member registration form.	
8.	Write an html page to provide menu driven option for following string operations and PHP script to evaluate the string functions. a) Reversing the string b) Finding the length of the string c) Substring operations d) Converting to uppercase e) Converting to lowercase f) Counting the number of words.	

PART-B ARRAY & DATABASE CONNECTIVITY PROGRAMS		
1.	Write a PHP program to read item name, item code, price and quantity. Calculate the total bill.	
2.	Write an html page to provide the menu options for to perform the following array operations and write a PHP script to evaluate the operations. a) reversing the array elements b) sorting the elements c) Finding maximum in array. d) Finding minimum in array. e) Searching the array elements	
3.	Create a table called “login” with fields username and password and write a PHP script to validate username and password.	

4.	Create a table called "book" with following fieldsi.e book title, author, accno, and publisher. Write a PHP script to search book by inputting acc.no.	
5.	Create a table called "items" with fields item name, item code, price. Write a PHP program to update the price of the item based on entered item code	
6.	Write a PHP program to create a student table and insert the data from the html page	
7.	Write PHP program to store and display the voters list. Create a table "votertb" with fieldsvoter_id, vname, gender, dob, address.	
8.	Write PHP program to perform the following operations on Bank Database. a) Deposit b) Withdraw c) Balance Enquiry • Create a table "Customer" with fieldsaccno, cust_name, cust_address, acc_type, balance. Assume that Customer table contains the data already • Validate the Account number for each transaction • For each transaction amount should be updated in the Customer table.	

Scheme of Examination for Practical

Practical Max. Marks: 40

One Program from Part A -10 Marks

One Program from Part B-20 Marks

Record: 5 Marks, Viva: 5 Marks

III B. Sc. - Computer Science (VI Semester- Paper 7- ELECTIVE PAPER)

G505.6 B2 - COMPUTER NETWORKS

Objectives:

- Provides the theoretical knowledge of data communication and computer networks.
- Helps in understanding the concepts of resource sharing.

Outcomes:

CO-1. Demonstrate the principles of application layer protocols.

CO-2. Distinguish transport layer services and protocols.

CO-3. Classify IP and Routing Algorithms in network layer.

CO-4. Demonstrate streaming and working of communication networks.

CO-5. Knowledge on different transmission modes,switching and multiplexing concepts.

UNIT – 1

Uses of Computer Networks

Business Applications, Home Applications, Mobile Users;

Network hardware

LAN, MAN, WAN, wireless networks, Home Networks, Internet works, introduction to Ad-hoc networks.

Network Software

protocol hierarchies, design issues for the layers, connection oriented and connectionless services, service primitives, the relationship of services to protocols.

Transmission Media

magnetic media, twisted pair, coaxial cable, fiber optics. **10 HOURS**

UNIT – 2

Communication network:

Line Configuration - Point- to- point, Multipoint, Topology - Mesh, Star, Tree, Bus, Ring, Hybrid Topology, Transmission Mode - Simplex, Half- duplex, Full- Duplex.

Elements of data communication:

Data and Signals - analog and digital signal.Periodic and A Periodic signals, composite signals.

Transmission Impairment attenuation, delay distortion, noise,

Encoding and Modulating

Digital to digital conversion, data encoding, unipolar, Polar-NRZ, NRZ-L, NRZ-I, RZ, Biphase, Manchester codes signals, bipolar- AMI, B8ZS, HDB3,

Transmission Modes

Parallel Transmission, Serial Transmission- asynchronous and synchronous transmission.

10 HOURS

UNIT – 3

Switching

Circuit Switching, Packet Switching, Message Switching.

Multiplexing

Many to one/one to many, Frequency division multiplexing (FDM).

Data security:

Error detection and correction - Types of errors, detection, Checksum, single bit error correction, Hamming Distance , Hamming code, Burst error correction.

Design and Setting a practical **Network**

Repeaters, Hubs, Bridges, Switches and Routers, Cables, IEEE 802.1, 802.6, token bus, token ring, FDDI

10 HOURS

UNIT – 4

Network Architecture and Distributed Processing

The OSI Reference Model, the TCP/IP Reference Model, comparison between OSI and TCP/IP reference Model Network standardization. network interface, principles of inter networking, internet protocols- TCP/IP, IP address class, network services, electronic mail, Digital Signature and Firewalls.

10 HOURS

Text Books:

1. Computer Networks – fourth edition - Andrew s. Tanenbaum, E E Edition. (Unit I, IV)

2. Data Communications and Networking- Behrouz A. Forouzan, 4th Edition, TATA McGraw Hill (Unit II, III)

Reference Books

1. Internetworking with TCP/IP, Vol 1, 2, 3 by Douglas E Comer
2. J.Martin, "Computer Network and Distributed Data Processing", Prentice Hall.
3. Fred Halsall, L.G. Kulkarni, "Computer Networking and the Internet", Pearson

Scheme of Theory Examination:

Theory (Three hours of duration for 100 marks) paper consists of TWO parts, PART-A and PART-B.

PART-A

Consists of 12 questions of 2 marks each. A student will select 10 questions.

(2X10=20 Marks)

PART-B

Consists of 4 Units. A student will select ONE question from each unit.

4X20=80 Marks

G 505.6BP: COMPUTER NETWORKS LAB

CO-1. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.

CO-2. Have a basic knowledge of the use of cryptography and network security.

CO-3. Specify and identify deficiencies in existing protocols, and then go onto formulate newand better protocols.

CO-4. Analyze, specify and design the topological and routing strategies for an IP based networking infrastructure

CO-5. Have a working knowledge of datagram and internet socket programming

Implement the concepts of Computer Networks such as:

1. Simulate Checksum Algorithm.
2. Simulate CRC Algorithm
3. Simulate Stop & Wait Protocol.
4. Simulate Go-Back-N Protocol.
5. Simulate Selective Repeat Protocol.
6. Socket programmes
7. Simulation of various topologies

Scheme of Practical Examination;

Practical (Two hours of duration for 40 marks)

One Program From Part A: 10 marks

One Program From Part B: 20 marks

Record: 5 Marks, Viva: 5 Marks

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