K.L.E. SOCIETY'S
BASAVAPRABHU KORE ARTS, SCIENCE AND COMMERCE
COLLEGE, CHIKODI – 591 201.
ACCREDITED at "A" with 3.26 CGPA in 3rd Cycle

Department of Computer Science

Computer Science Course Structure Academic Year 2019-20

Course	Course Type	Course Title	Lectures/ Week Theory/ Practical
B.Sc-I Semester	Core Course	Programming with C Programing Lab- C Lab	4/4
B.Sc-II Semester	Core Course	Data Structure using C Programing Lab-Data Structures Using C	4/4
B.Sc-III Semester	Core Course	Digital Logic and Computer DesignPrograming Lab-Digital Logic	4/4
B.Sc-IV Semester	Core Course	Operating System Principles Programing Lab-Linux	4/4
B.Sc-V Semester	Core Course	Relational Database Management System Object Oriented Programming using Java Programing Lab-SQL and PL/SQL lab and Java programming	8/8
B.Sc-VI Semester	Core Course	Data Communications and Computer Networks Web Programming Programing Lab-Web Programming Lab, Network Lab	8/8
B.Com-II Semester	Core Course	Computer Applications in Business-I	4/2
B.Com –III Semester	Core Course	Computer Applications in Business-II	4/2
B.Com -IV Semester	Core Course	Computer Applications in Business-III	4/2
B.Com -V Semester	Core Course	Computer Applications in Business-IV	4/2

B.Com -VI Semester	Core Course	Computer Applications in Business-V	4/2

FIRST-TERM (Objectives, Outcomes, Learning Materials & Assessment)

Course:B.Sc-I	**Programming with C(Lectures/Week:4)** **Facilitator: Smt. T. R. Patil**

Objectives:

The objective of this course is to provide a comprehensive study of the C programming language, stressing upon the strengths of C, which provide the students with the means of writing modular, efficient, maintenance and portable code.

Learning Outcomes:

- Students should be able to write, compile and debug programs in C language.
- Students should be able to use different data types in a computer program.
- Students should be able to design programs involving decision structures, loops and functions.
- Students should be able to explain the difference between call by value and call by reference.
- Students should be able to explain the difference types string functions.
- Students should be able to use different data structures.

UNIT-I	**Evolution of information processing**: Concept of data and information, data processing. Hardware –CPU, Storage Devices & Media, VDU, Input – Output devices, Types of Software – System Software, Application Software. Overview of OS. Programming Languages and its Classification, Compiler, Interpreter, Linker, Loader. **Problem Solving**: Problem Identification, Analysis, flowcharts, Decision Tables, Pseudo codes and algorithms, Program Coding, Program Testing and Execution..	10Hrs
UNIT-II	**Overview of C**: Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant, Structure of a C Program, printf(), scanf() Functions, Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.	10Hrs
UNIT-III	**Decision making & branching**: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement. Decision making & looping: For, while, and do-while loop, jumps in loops - break, continue statement, Nested loops. **Functions:** Standard Mathematical functions, Input/output: Unformatted & formatted I/O function in C. User defined functions: definition, prototype, Local and global variables, passing parameters, recursion.	10Hrs

UNIT-IV	Arrays, strings and pointers: Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. String constant and variables, Declaration and initialization of string, Input/output of string data, Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime. **String Handling:** String Library Functions: strlen, strcat, strcmp, strcpy, strrev.	10Hrs
UNIT-V	**Structure & Union**: Definition of Structure, Declaring Structure, Accessing Structure Elements, Array of Structure, Nesting of Structure. Definition of Union, declaring and using Union. Difference between Structure & Union. **Error Handling during I/O Operations**, Command Line Arguments, Documentation, debugging, C Processors, Macros.	10Hrs

Learning Materials: Text Books

Programming in ANSI C(Third Edition):E Balaguruswamy
Yashavant P.Kanetkar. "Let Us C", BPB Publications.
Soft and Hard copy of Notes, References Websites

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to 04
Internal Test 2:	80 marks reduced to 10
Attendance:	03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:	03

2. Semester End Examination as per University guidelines: 80 marks

Course:B.Sc-III	**Digital Logic and Computer Design.(Lectures/Week:4)** **Facilitator: Miss S M Hegale**

Objectives: To provide understanding of the basic principles of digital computers.

Learning Outcomes:

1) Students will understand how computer systems work and its underlying principles.
2) Students will understand the basics of digital electronics.

UNIT-I	Digital Systems and Binary Numbers: Digital Systems, Number systems and base conversions, Representation of signed Binary Numbers, Binary codes, binary logic.	10Hrs
UNIT-II	Boolean Algebra: Introduction to Boolean Algebra, Axioms and Laws of Boolean Algebra, Boolean functions, Canonical and Standard Forms. Gate – Level Minimization: The Map method, Two, Three, Four Variable K-map's, Don't Care Conditions, NAND and NOR implementation, Exclusive OR function.	10Hrs

UNIT-III	Combinational Logic: Combinational logic circuits, analysis and design procedure, Binary adder and subtractor, decimal adder, binary multiplier, Magnitude comparator, Decoders, Encoders, Multiplexers.	10Hrs
UNIT-IV	Synchronous Sequential Logic: Sequential circuits, Latches, Flip Flops, SR, JK, T, D Flip Flops, Flip Flop excitation tables. Registers and Counters: Registers, Shift registers, Ripple counters, Synchronous counters, Other counters.	10Hrs
UNIT-V	Memory and Programmable Logic: Random access memory, memory decoding, error detection and correction, Read-Only memory, Programmable logic array, Programmable array logic, sequential programmable devices.	10Hrs

Learning Materials: Text Books: References:

1. M. M. Moris and Michael D. Ciletti, Digital Design, 5th Edition, Pearson.
2. M. Moris Mano, Digital Logic and Computer Design, 4th Edition, Pearson.
3. Paul Malvino, Digital Principles and Applications by Leach, 57th Edition, Tata McGrawHill.

Additional Reading:

4. Charles H.Roth, Fundamentals of Digital Logic Design, 5th Edition, Cengage
5. G.K. Kharate, Digital Electronics, Oxford University Press
6. A. Anand Kumar, Switching Theory and Logic Design, 2nd Edition, PHI.

Soft and Hard copy of Notes, References Websites.

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2. Semester End Examination as per University guidelines: 80 marks

Course:B.Sc-V	**Relational Database Management Systems (Paper – I)** **(Lectures/Week:4)Facilitator: Miss V K Badiger**

Objectives:

To introduce the concept of the DBMS with respect to the relational model, to specify the functional and data requirements for a typical database application and to understand creation, manipulation and querying of data in databases.

Learning Outcomes:

1. Understand relational data base management system concepts.
2. Ability to evaluate business information problem and find the requirements of a problem in terms of data.
3. Ability to design the database schema with the use of appropriate data types for storage of data

in database.
4. Ability to create, manipulate, query the database tables.

UNIT-I	**Introduction:** Introduction: Purpose of Database Systems, View of Data, Database Languages, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators.	10Hrs
UNIT-II	**Introduction to the Relational Model**: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations. Formal Relational Query Languages: The Relational Algebra, the Tuple Relational Calculus, The Domain Relational Calculus.	10Hrs
UNIT-III	**Database Design and the E-R Model:** Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features. Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms-2NF,3NF, refinement, BCNF, and 4NF, Database-Design Process, Modelling Temporal Data.	10Hrs
UNIT-IV	**Data Storage:** Overview of Physical Storage Media, Magnetic Disk and Flash Storage, RAID, File Organization, Organization of Records in Files, Data-Dictionary Storage, Database Buffer, Indexing and Hashing concepts, Ordered Indices, B+-Tree Index Files, Multiple-Key Access, Static Hashing, Dynamic Hashing, Bitmap Indices.	10Hrs
UNIT-V	**Transactions and concurrency control:** locking, time stamping and data recovery. Introduction to SQL: SQL Data Definition, Basic Structure of SQL Queries, Basic Operations- Set Operations, Null Values, Aggregate Functions, Nested Sub queries, Modification of the Database, Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization. Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers,Recursive Queries.	10Hrs

Learning Materials:

Text books:

1.Abraham Silberschatz, Henry F. and S. Sudarshan, Database System Concepts, 6th edition, Mc Graw Hill.
2. Coronel, C. M., Morris, S. & Rob, P., Database systems: Design, implementation, and Management (10th ed.). Boston: Cengage Learning

Assessment

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100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1: 20 marks reduced to 04

Internal Test 2: 80 marks reduced to 10

Attendance: 03

Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC: 03

2. Semester End Examination as per University guidelines: 80 marks

Course:B.Sc-V	**JAVA (Paper – II)(Lectures/Week:4)** **Facilitator: Miss S M Hegale**

Objectives:

To provide comprehensive study on object oriented paradigm and concepts. Efficiency in computer programming using Java.

Learning Outcomes:

1. Understand the basic concepts of object orientation.
2. Understand the syntax of JAVA
3. Ability to program using object oriented concept.

UNIT-I	Fundamentals of Object Oriented Programming(OOP), difference between Procedural and Object oriented programming , basic OOP concept - Object, classes, abstraction, encapsulation, inheritance, polymorphism . History of Java, features of Java, JDK Environment, Java Virtual Machine, Java Runtime environment.	10Hrs
UNIT-II	Identifiers and Keywords, data types, Java coding Conventions, expressions, control structures, decision making statements, Arrays and its methods, Garbage collection & finalize() method. Java classes, define class with instance variables and methods, object creation, accessing member of class, argument passing, Constructors, Method overloading, static data, static methods, static blocks, this keyword, Nested & Inner classes, Wrapper Classes, String (String Arrays, String Methods, StringBuffer)	10Hrs
UNIT-III	Inheritance: Super class & subclass, abstract method and classes, method overriding, final keyword, super keyword, down casting and up casting, dynamic method dispatch. Packages and Interfaces: Importing classes, user defined packages, modifiers & access control (Default, public, private, protected, private protected), implementing interfaces, user defined interfaces, Adapter classes	10Hrs
UNIT-IV	Exception handling: Types of Exceptions, try, catch, finally, throw, throws keywords, creating your own exception, nested try blocks, multiple catch statements, user defined exceptions. Java Input Output: Java IO package, File, Class Byte/Character Stream, Buffered reader / writer, File reader / writer Print writer File Sequential / Random Serialization and de serialization. Multithreading: Multithreading Concept, thread life cycle, creating multithreading application, thread Priorities, thread synchronization, and inter thread communication	10Hrs
UNIT-V	Abstract Window Toolkit: Components and Graphics, Containers, Frames and Panels, Layout Managers, AWT all Components, Event Delegation Model, Working with Graphics and Text.	10Hrs

Learning Materials:

Text Book:

1. Herbert Schildt, The Java 2 : Complete Reference, Fourth edition, TMH, 2. Balaguruswamy, Programming with JAVA, A primer, TATA McGraw-Hill Company.
2. Soft and Hard copy of Notes, References Websites.

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2. Semester End Examination as per University guidelines: 80 marks

Practical:

B.Sc-I Semester	**Programming Lab- C programming Practical Hours: 4 Hrs/week** **Facilitators: Miss V.K. Badiger, Smt. T.R Patil**
	1. Write a program to enter length and breadth of a rectangle and find its perimeter and area. 2. Write a program to enter P, T, R and calculate Simple Interest. 3. Write a program to find maximum between three numbers. 4. Write a program to check whether year is leap year or not using conditional/ternary operator. 5. Write a program to function as a basic calculator; 6. Write a program that takes in three arguments, a start temperature (in Celsius), an end temperature (in Celsius) and a step size. Print out a table that goes from the start temperature to the end temperature, in steps of the step size; Celsius to Fahrenheit. 7. Write a program to sort array elements in ascending order. 8. Write a program to subtract/add/multiply two matrices. 9. Write a program to check whether an alphabet is vowel or consonant using switch case. 10. Write a program to display all possible permutations of a given input string--if the string contains duplicate characters, you may have multiple repeated results. Input should be of the form permute *string* and output should be a word per line. Here is a sample for the input *cat* 11. Write a function that accepts a number, n, and prints all prime numbers between 1 to n. 12. Write an iterative function calculates factorial of a given integer. 13. Write a program to find HCF (GCD) of two numbers by passing two numbers to function comp GCD(). 14. Write a program to find maximum and minimum element in an array by passing array to function. 15. Write a program to input electricity unit charges and calculate total electricity bill according to the given condition: For first 50 units Rs. 0.50/unit For next 100 units Rs. 0.75/unit For next 100 units Rs. 1.20/unit For unit above 250 Rs. 1.50/unit An additional surcharge of 20% is added to the bill 16. Write a program to input marks of five subjects Physics, Chemistry, Biology,

	Mathematics and Computer. Calculate percentage and grade according to following. Use structure to create array of students and compute percentage and grade by passing structure to function. Percentage >= 90% : Grade A Percentage >= 80% : Grade B Percentage >= 70% : Grade C Percentage >= 60% : Grade D Percentage >= 40% : Grade E Percentage < 40% : Grade F 17. Write a C program to add two complex numbers by passing structure to a function. Consider the following structure definition for complex number 18. Write a C program to illustrate difference between structure and union by defining emp_Name, salary, job as members and displaying the size of the defined structure and union. (i.e. In terms of memory allocation) 19. Write a program that accepts a base ten (non-fractional) number at the command line and outputs the binary representation of that number. 20. Write a C program to concatenate two strings without using library function 21. Write a C program to compare two strings without using library function 22. Write a C program to illustrate string library functions (copy, concat, uppercase to lower case and vice-versa, length of string, sort set of strings(use strcmp()).
B.Sc-III Semester	**Programming Lab- Digital Logic Practical Hours: 4 Hrs/week** **Facilitators: Miss S.M. Hegale, Smt. T.R. Patil**
	Note : Logisim simulator can be used for performing experiments. 1. For the following functions, construct a truth table and draw a circuit diagram. a) y(A,B) = (AB)' + B' b) y(A,B,C) = (A + B)' C c) y(A,B,C) = (AC)' + BC d)y(A,B,C) = (A □ B)C' e) y(A,B) = A' + B f) y(A,B,C) = ((A+B)'(B+C)')' 2. Study and verify the truth table of various logic gates NOT, AND, OR, NAND, NOR, EX-OR, and EX-NOR 3. Simplify Boolean expressions and realize it. 4. Verification of Boolean Theorems using basic gates. 5. Design a 4-input NAND gate using two 2-input NAND gates and one 2-input NOR gate. Hint: Use DeMorgan's law 6. Construct the K-map for each of the following functions (a) f(A,B,C) = AB + A'BC' + AB'C (b) g(A,B,C) = A'C + ABC + AB' (c) h(A,B,C,D) = A'BC' + (A □ B)C + A'B'CD' + ABC 7. For g(A,B,C) = A'C + ABC + AB', design the circuit for the minimal SOP expression found in problem 4 using just NAND gates and inverters. Label the pinouts on the circuit diagram. Build the circuit and demonstrate the working circuit. 8. For the functions listed below, construct a K-map and determine the minimal SOP expression. a. f(a,b,c) = a'b'c' + a'bc' + abc' + abc b. g(a,b,c) = ab'c' + abc' + abc + don't cares(a'bc + ab'c) Build the circuit required for (b) 9. Design and verify a half/full adder 10. Design and verify half/full subtractor 11. Design a 4 bit magnitude comparator using combinational circuits. 12. Design and verify the operation of flip-flops using logic gates. 13. A two bit counter is to be built that will count forward, 00 → 01 → 10 → 11 → 00, when a logical input is set high and counts in reverse order when it is low. (a) Draw the state transition diagram for this state machine. (b) Assuming a state machine were to be built using D flip-flops, determine the

	value of the next state for each of the flip-flops. 14. Verify the operation of a counter. 15. Verify the operation of a 4 bit shift register 16. Using SPIM, write and test an adding machine program that repeatedly reads in integers and adds them into a running sum. The program should stop when it gets an input that is 0, printing out the sum at that point.
	Assessment: Evaluation criteria for practical examinations shall be as follows: **1. Writing of Programs -15 Marks** a. One program from the journal list – 08 Marks b. Another program given by examiner based on the concepts studied -07Marks **2. Execution of programs – 15 Marks** a. Journal Program - 08 Marks b. Program of Examiner's Choice -07 Marks **3. Viva-Voce -05 Marks** **4. Journal / Laboratory Report – 5 Marks** **Total Marks -40 Marks**
B.Sc –V Semester	**Programming Lab- SQL and PL/SQL Lab. Practical Hours: 4 Hrs/week** **Facilitators: Miss V.K. Badiger, Shri. V.M. Bagi**
	1. Draw E-R diagram and convert entities and relationships to relation table for a given scenario. a. Two assignments shall be carried out i.e. consider two different scenarios (eg. bank, college) 2. Write relational algebra queries for a given set of relations. 3. Perform the following: a. Viewing all databases, Creating a Database, Viewing all Tables in a Database, Creating Tables (With and Without Constraints), Inserting/Updating/Deleting Records in a Table, Saving (Commit) and Undoing (rollback) 4. Perform the following: a. Altering a Table, Dropping/Truncating/Renaming Tables, Backing up / Restoring a Database. 5. For a given set of relation schemes, create tables and perform the following Simple Queries, Simple Queries with Aggregate functions, Join Queries- Inner Join, Outer Join Subqueries- With IN clause, With EXISTS clause 6. For a given set of relation tables perform the following a. Creating Views (with and without check option), Dropping views, Selecting from view 7. Write a Pl/SQL program using FOR loop to insert ten rows into a database table. 8. Given the table EMPLOYEE (EmpNo, Name, Salary, Designation, DeptID) write a cursor to select the five highest paid employees from the table. 9. Illustrate how you can embed PL/SQL in a high-level host language such as C/Java and demonstrates how a banking debit transaction might be done. 10. Given an integer i, write a PL/SQL procedure to insert the tuple (i, 'xxx') into a given relation. **Assessment:** Evaluation criteria for practical examinations shall be as follows: **1. Writing of Programs -15 Marks** a. One program from the journal list – 08 Marks

	b. Another program given by examiner based on the concepts studied -07Marks **2. Execution of programs – 15 Marks** a. Journal Program - 08 Marks b. Program of Examiner's Choice -07 Marks **3. Viva-Voce -05 Marks** **4. Journal / Laboratory Report – 5 Marks** **Total Marks -40 Marks**
B.Sc –V Semester	**Practical Hours: 4 Hrs/week** **Facilitators: Miss S.M. Hegale, Miss V.K. Badiger and Smt. T. R. Patil**
	1) Define a class that will hold the set of integers from 0 to 31. An element can be set with the set member function and cleared with the clear member function. It is not an error to set an element that's already set or clear an element that's already clear. The function test is used to tell whether an element is set. 2) Write a Java program that creates an object and initializes its data members using constructor. Use constructor overloading concept. 3) Write your own simple Account class. 4) Write a derived class Deposit Account that inherits from the Account class. The account should pay interest at an annual rate that is private member data, but impose a £10 fee for every withdrawal. You should overload the member functions of Account where necessary. How will you determine when to pay interest? 5) Write a java program to calculate gross salary & net salary taking the following data. Input: empno, empname, basic Process: DA=50%of basic HRA=12%of basic CCA=Rs240/- PF=10%of basic PT=Rs100/- 6) Write a Java program to sort the elements using bubble sort. 7) Write a Java program to search an element using binary search. 8) Write a Java program that counts the number of objects created by using static variable. 9) Write a Java program to count the frequency of words, characters in the given line of text. 10) Write a java program to find the details of the students eligible to enroll for the examination (Students, Department combined give the eligibility criteria for the enrolment class). 11) Write a java program to identify the significance of finally block in handling exceptions. 12) Write a java program to access member variables of classes defined in user created package 13) Write a Java Program to implement multilevel inheritance by applying various access controls to its data members and methods. 14) Write a Java Program to implement Vector class and its methods. 15) Write a java program to implement exception handling using multiple catch statements 16) Write a program to demonstrate use of user defined packages. 17) Design stack and queue classes with necessary exception handling. Test the classes by writing a tester program 18) Write a Java program to illustrate AWT controls frame, panel, layout manager, command button and text boxes. 19) Write a Java program to illustrate basic calculator using grid layout manager. 20) Illustrate creation of thread by extending Thread class 21) Illustrate thread creation by implementing runnable interface. **Assessment:**

	Evaluation criteria for practical examinations shall be as follows: **1. Writing of Programs -15 Marks** a. One program from the journal list – 08 Marks b. Another program given by examiner based on the concepts studied -07Marks **2. Execution of programs – 15 Marks** a. Journal Program - 08 Marks b. Program of Examiner's Choice -07 Marks **3. Viva-Voce -05 Marks** **4. Journal / Laboratory Report – 5 Marks** **Total Marks -40 Marks**	
Course: B.com III Sem	**Computer Applications in Business-I (Lectures/Week:4)** **Facilitator: Mr. V M Bagi**	
UNIT-I	**Introduction to MS EXCEL**: Features of MS Excel - Spreadsheet worksheet , workbook , cell, cell pointer, cell address etc - Parts of MS Excel window – Saving , Opening and Closing Workbook – Insertion and deletion of worksheet– Formatting - Auto Fill – Formulas and its Advantages – References: Relative, absolute and mixed.	10Hrs
UNIT-II	**Working with MS EXCEL**: Functions: Meaning and Advantages of functions, different types of functions available in Excel – Templates – Charts – Graphs – Macros: Meaning and Advantages of macros, creation, editing and deletion of macros – Data Sorting, Filtering, Validation, Consolidation, Grouping, Pivot Table and Pivot Chart Reports.	10Hrs
UNIT-III	**DBMS**: Database Systems – Evolution – File Oriented Systems – Database Models - database System Components – Database Systems in the Organization - Data Sharing Strategic Database Planning – Database and Management Control – Risks and Costs, Database development. Database Design – Principles of Conceptual Database Design – Conceptual Data Models, Fundamentals concepts – Relational Model – Relational Database Implementation.	10Hrs
UNIT-IV	**MS ACCESS**: Data , Information, Database, File , Record , Fields – Features, advantages and limitations of MS Access – Application MS Access – parts of MS Access window – Tables, Forms, Queries and Reports - Data validity checks.	10Hrs
UNIT-V	**Management Information System**: Concept of MIS, DATA, Source of DATA , Data Processing, Information Requirements of different levels of organization. Desired Properties of Management Information. Role of a system Analyst and his responsibilities in an organization.	10Hrs
LAB WORK-PRACTICALS MS EXCEL - Creating Commerce oriented applications. MS ACCESS – Creating Commerce oriented applications.		
Learning Materials:Text Books/Websites: 1. Microsoft Office Sanjay Saxena 2. Biradar and Sanaki ,computer Applications in Business-III 3.Ramgouda Patil, computer Applications in Business-III		
Assessment Assessment is carried out as per the guidelines laid down and mandated by the affiliating		

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2. Semester End Examination as per University guidelines: 80 marks

Course: B.com V Sem	**Computer Applications in Business-IV (Lectures/Week:4)** **Facilitator: Mr. V. M. Bagi.**	
UNIT-I	**E-Commerce:** Overview of E-commerce, Definition, E-Business, benefits of E-commerce, Impact of e-Commerce on Business models. E- Commerce applications- Market forces influencing highway- Global information distributed networks. Consumer oriented E-commerce applications, Electronic payment system, types of payment systems (Credit Card, E-cash, Smart Card- Digital payments.) Risks in e-Payments, designing e-Payments, E-business applications, Internet bookshops, Internet banking, online share dealing grocery supply, software support, electronic Newspaper and virtual auctions.	10Hrs
UNIT-II	**Concepts of Computer Networks:** Network Concepts, Categories of Network, LAN, WAN, MAN, Internet, Intranet and Extranet, Seven Layers of the OSI Reference Model, Business through Internet.	10Hrs
UNIT-III	**HTML:** Introduction, HTML editors, HTML Document Structure. HTML tags, Formatting Text in HTML, FONT and other tags. Paragraph tags, Adding graphics to web pages, Adding links to web pages, external and internal links. Using tables in HTML documents, adding list to web pages. Adding frames to web pages, HTML forms, Marquee tag, Image maps, SGML. Creating web page using web page wizard.	10Hrs
UNIT-IV	**Visual Basic .net:** Introduction to Visual Basic.net, VB.net Environment, Menu Bar, Tool Box, Properties Box, Tool Bar, Project Box, Screen Box, Customizing the Environment, Inserting Dialog Box, Label, Combo, Picture, Frames, Scroll Bar and Sliders. Working with Forms, Changing the properties of the Form, Multiple Forms, Designing Menus, Hierarchy, Expressions, I/O Operations, Branching, Looping..	10Hrs
UNIT-V	**Electronic Data Interchange (EDI) and Electronic Payment System** : Introduction, Advantage and Disadvantage of EDI and Electronic Payment Systems, Supply Chain Management, Business Process Re-engineering commerce providers legal issues and Securities, Money Credit Cards ,Transactions and Validation, Digital Certification Authentication.	10Hrs

LAB WORK-PRACTICALS

Creating simple static web site using HTML and Microsoft front page editor.

Practical's based on Visual Basic .net.

Learning Materials

Text Books/Websites:

1. E- commerce – A Managerial Perspective: michael change, et al
2. E- Commerce- Dr Shivani Arora

3. www.Internet.com
4. www.livinginternet.com
5. Biradar and Sanaki ,computer Applications in Business-V
6.Ramgouda Patil, computer Applications in Business-V

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SECOND-TERM

Course: B.Sc-II	**Data Structure using C (Lectures/Week:4)** **Facilitator: Shri. B. N. Shivkumar**

Objectives:

To understand the concepts of Data Structures and its significance in solving problems using programming concepts. Provide holistic approach to design, use and implement abstract data types. Understand the commonly used data structures and various forms of its implementation for different applications using C

Learning Outcomes:

- Design and implement commonly used Data structures
- Design Abstract Data types and its implementation
- Ability to program various applications using appropriate data structures

UNIT-I	**Advanced C**: Dynamic memory allocation and pointers in C- Declaring and initializing pointers, Pointer & Functions, Pointer & Arrays, Pointer & Strings, Pointer& Structure, Pointer to Pointer. Static and dynamic memory allocation. Memory allocation functions :malloc, calloc, free and realloc. File Management in C: Defining and Opening & Closing File, Input & Output Operations on Files, Random Access to Files.	10Hrs
UNIT-II	**Introduction to Data structures**: Definition, Classification of data structures: primitive and nonprimitive. Operations on data structures **Search**: Basic Search Techniques- sequential search, Binary search-Iterative and Recursive methods. **Sort**- General Background: Definition, different types: Bubble sort, Selection sort, Merge sort, Insertion sort, Quick sort	10Hrs

UNIT-III	**Recursion:** Definition, Recursion in C, Writing Recursive programs – Binomial coefficient, Fibonacci, GCD, towers of Hanoi. **Stack** – Definition, Array representation of stack, Operations on stack-push and pop, Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix, applications of stacks.	10Hrs
UNIT-IV	Queue - Definition, Array representation of queue, Types of queue: Simple queue, circular queue, double ended queue (deque) priority queue, operations on all types of Queues.	10Hrs
UNIT-V	**Linked list** – Definition, components of linked list, representation of linked list, advantages and disadvantages of linked list, Arrays versus linked list, Types of linked list: Singly linked list, doubly linked list, Circular linked list and circular doubly linked list. Operations on singly linked list: creation, insertion, deletion, search and display. Implementation of stack and queues using linked list.	

Learning Materials: Text Books:

1. A. K. Sharma, Data Structures Using C, 2nd edition, Pearson Education.
2. Achuthsankar S. Nair, T. Makhalekshmi, Data Structures in C, PHI.
3. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, Pearson Education.

Soft and Hard copy of Notes, References Websites

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to	04
Internal Test 2:	80 marks reduced to	10
Attendance:		03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:		03

2. Semester End Examination as per University guidelines: 80 marks

Course: B.Sc-IV	**Operating System (Lectures/Week:4)** **Facilitator :Smt. T.R. Patil**

Objectives: Students will demonstrate knowledge of process control, threads, concurrency, memory management scheduling, I/O and files, distributed systems, security, networking. Student teams will implement a significant portion of an operating system.

Learning Outcomes:

1. Understand the structure and functions of operating system
2. Understand the various Operating system management strategies
3. Understand the basics of Linux operating system
4. Linux and Unix pertaining with Process , File , I/O management.

UNIT-I	**Introduction:** Batch Systems, Concepts of Multiprogramming and Time Sharing, Parallel, Distributed and real time Systems, Operating System Structures, Components and Services, System programs, Virtual machines. **Process Management :** Process concept, Process scheduling, Co-operating process, Threads, Inter process communication, CPU scheduling criteria, Scheduling algorithm.	10Hrs
UNIT-II	**Process synchronization and deadlocks:** The critical section problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, monitors, Dead locks –System model , characterization, Dead lock prevention, avoidance and detection, Recovery from dead lock.	10Hrs
UNIT-III	**Memory Management:** Logical and Physical address space, Swapping Contiguous allocation, Paging, Segmentation, Virtual memory – Demand paging and its performance, page replacement algorithms, Allocation of frames, thrashing**.**	10Hrs
UNIT-IV	**File management (System, Secondary storage structure):** File concepts, Access methods, Directory structure, Protection and consistency, semantics, File system structure, Allocation methods, Free space management.	10Hrs
UNIT-V	**Disk Management (Structure, Disk Scheduling Methods):** Disk structure and Scheduling methods, Disk management, Swap – Space management. **Protection and Security:** Goals of protection, Domain protection, Access matrix security problem, Authentication, One time password.	10Hrs

Learning Materials: Text Books:

1. Abraham siberschatz and peter Bear Galvin, Operating System Concepts, Fifth Edition, Addision – Wesley
2. Nutt: Operating system, 3/e person education 2004.

Soft and Hard copy of Notes, References Websites

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to	04
Internal Test 2:	80 marks reduced to	10
Attendance:		03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:		03

2. Semester End Examination as per University guidelines: 80 marks

Course: BA/B.Sc-IV	**Computer Applications (Compulsory)Teaching hour per week: 04** **Facilitators:Miss S.M. Hegale, Miss V. K. Badiger and Smt. T. R. Patil**

Objectives: The course is designed to aim at imparting a basic level appreciation programme for the common man. After completing the course the user is able to the use the computer for basic purposes of viewing information on Internet (the web), sending mails, using internet banking services.

UNIT-I	**Introduction:** Computer, data processing, characteristic features of computers. Basic computer organization: Basic operations performed by computers, basic organization of computer system, input units and its functions, output units and its functions, storage units and its functions, types of storage. Number systems: non-positional number system, positional number system, decimal, binary, octal and hexadecimal number systems. Conversion from decimal to binary and vice-versa for integer numbers only.	10hrs
UNIT-II	**Processor and memory:** Internal structure of processor, memory structure, types of processors, main memory organization, random access memory, read only memory, cache memory. Secondary storage: secondary storage devices and their needs commonly used secondary storage devices, sequential and direct access storage devices (magnetic disk, optical disk, flash drives, memory card, and disk array). IO devices: commonly used input output devices	10hrs
UNIT-III	**Software:** Software and its relationship with hardware, types of software, relationship among hardware, system software, application software and users of computer systems, steps involved in software development, firmware, middleware. Overview of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user and multi-user operating system.	10hrs
UNIT-IV	**Overview of Networking:** An introduction to computer networking. Network types (LAN, WAN, MAN), Network topologies, Modes of data transmission. Forms of data transmission, transmission channels (media). Fundamentals of Electronic Mail: Basic E-mail facts, Email advantages and disadvantages, Email addresses, passwords and user-ids. Mailer features, Email inner workings, Email management, Multipurpose Internet Mail Extensions (MIME). Browsing and Publishing: Browser Bare Bones, Coast-to-Coast Surfing, Hypertext Markup Language: Introduction, web page installation, web page setup HTML formatting and Hyperlink creation.	10hrs
UNIT-V	**The Internet:** What is the Internet? The Internet defined, Internet history, The way the Internet works, Internet congestion, Internet culture, Business Culture and the Internet, Collaborative computing and the internet. The World Wide Web Defined. Web browser details, Web writing styles, web presentation outline, design and management, registering web pages, Linux: Text based web browser, searching the World Wide Web: Directories, Search engines.	10hrs

Learning Materials:

Text Books: P.K. Sinha and Priti Sinha. Computer Fundamentals, Sixth Edition, BPB Publication. Rajaraman V.

Soft and Hard copy of Notes and References Websites.

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to	04
Internal Test 2:	80 marks reduced to	10
Attendance:		03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:		03

2. Semester End Examination as per University guidelines: 80 marks

Course:B.Sc-VI	**Data communication and Computer Network (Paper – I)** **(Lectures/Week:4)Facilitator: Miss. S.M. Hegale**

Objectives:

To provide an introduction to the fundamental concepts on data communication and the design, deployment, and management of computer networks.

Learning Outcomes:

- Understand the basic concepts of data communications
- Understand the significance of protocols in communication
- Identify the different components and their respective roles in a communication system

UNIT-I	Introduction: Data Communications, Networks, the internet, protocols and standards, network models – OSI model, TCP/IP protocol suite, addressing.	08Hrs
UNIT-II	Data and Signals: Periodic analog signals, digital signals, transmission impairment, data rate limits, performance. Digital transmission: Digital to digital conversion, analog-to-digital conversion, transmission modes.	08Hrs
UNIT-III	Physical Layer and Media: Analog transmission: Digital-to-analog conversion, analog-to-analog conversion. Multiplexing and Spread spectrum. Transmission media – Guided media and unguided media.	10Hrs
UNIT-IV	Switching: Circuit-switched networks, datagram networks, virtual-circuit networks, structure of a switch. Telephone networks, dialup modems, digital subscriber line, cable-tv networks Detection and Correction: Errors, redundancy, detection versus correction, block coding, linear block codes, cyclic codes, checksum.	12Hrs
UNIT-V	Data Link Control: Framing, flow and error control, noiseless and noisy channels, HDLC, point-to- point control. Multiple Access: Random access ALOHA, controlled access, channelization. Wired LANs: Ethernet. Wireless LANs. Connecting LANs, Backbone Networks, and Virtual LANs	12Hrs

Learning Materials:

Text books:

Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Fifth Edition, Pearson Pub. 2012

William Stallings, Data and Computer Communications, 7th Edition, PHI.

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to	04
Internal Test 2:	80 marks reduced to	10
Attendance:		03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:		03

2. Semester End Examination as per University guidelines: 80 marks

Course:B.Sc-VI	**Web Programming (Paper – II)** **(Lectures/Week:4)Facilitator: Miss. V.K. Badiger**

Objectives:

To provide fundamental tools and techniques for developing web based applications

Learning Outcomes:

- Understand the basic concepts of internet programming.
- Programming static and dynamic web pages.
- Ability to create an web based application.

UNIT-I	Applet Programming - Creating and executing Java applets, inserting applets in a web page. Review of AWT Classes, Event Handling, Swing classes, Java swing - JApplet, icons and labels, text fields, buttons, combo boxes, tabbed and scroll panes, trees, tables.	10Hrs
UNIT-II	Fundamentals of Web: Internet, WWW, Web Browsers, and Web Servers, URLs, MIME, HTTP, Security, the Web Programmers Toolbox. XHTML: Origins and evolution of HTML and XHTML, Basic syntax, Standard XHTML document structure, Basic text markup, Images, Hypertext Links, Lists, Tables. HTML and XHTML: Forms, Frames in HTML and XHTML, Syntactic differences between HTML and XHTML. Cascading Style Sheets: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The Box model, Background images, The and tags.	10Hrs
UNIT-III	JAVA Script: Java Script: Overview of JavaScript; Object orientation and JavaScript; General syntactic characteristics; Primitives, Operations, and expressions; Screen output and keyboard input; Control statements; Object creation and Modification; Arrays; Functions; Constructor; Pattern matching using expressions; Errors in scripts; Examples.	10Hrs
UNIT-IV	Java Script and HTML Documents: The JavaScript execution environment; The Document Object Model; Element access in JavaScript; Events and event handling; Handling events from the Body elements, Button elements, Text box and Password elements; The DOM 2 event model; The navigator object; DOM tree traversal and modification. Dynamic Documents with JavaScript.	10Hrs
UNIT-V	Introduction of skills and practices related to Extensible Markup Language (XML). Includes and valid XML documents, XML schemes, and Extensible Style Language (XSL). Perl and CGI: Introduction Perl program, scalar, arrays, hashes, control structure, passing text, bits and pieces. Developing CGI application Servlets and server pages	10Hrs

Learning Materials:

Text books:

Thomas a Pawel HTML & XHTML Complete reference.

Chris Bates, Web Programming -Building Internet Applications, Wiley Student edition
https://www.w3schools.com/tags/att_meta_name.asp
http://html.com/ , https://javascript.info/ 11. https://www.w3schools.com/html/default.asp, https://www.w3schools.com/css/default.asp

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to	04
Internal Test 2:	80 marks reduced to	10
Attendance:		03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:		03

2. Semester End Examination as per University guidelines: 80 marks

Course: B.Com II Sem	**Computer Applications in Business-I (Lectures/Week:4)** **Facilitators: Mr. V M Bagi and Shri. Shivkumar B.N**	
UNIT-I	**Introduction to computers:** Definition, Characteristics and limitations of computers – Elements of Computers – Hardware – CPU – Primary and Secondary memory - Input and Output devices. Software and types of software, Applications of Computers in IT enabled services – BPO, KPO, Call Centers.	10Hrs
UNIT-II	**Modern Communications (Concepts only) :** Communications - FAX, Voice mail and Information services, e-mail, Creation of e-mail ID, Group communication, Tele-conferencing, Video conferencing , File exchange ,Bandwidth , Modem , Basics of Networking , Network types LAN, MAN, WAN and network topology , Dial up access	10Hrs
UNIT-III	**Operating System and Windows XP:** Operating Systems: Meaning, Definition, Functions and Types of Operating Systems – Batch Processing, Multi Programming, Time Sharing, On-Line and Real Time Operating Systems. Booting Process, Disk Operating System, Computer Virus, Cryptography, and Windows Operating System - Desktop, Start menu, Control panel, and Windows accessories	10Hrs
UNIT-IV	**MS WORD :** Meaning and features of Word processing, Advantages and applications of word processing , Elements of MS Word application window, Toolbars, Creating , Saving and closing a document, Opening and editing a document , Moving and copying text, Text and Paragraph formatting, Format Painter, applying Bullets and Numbering , Find and Replace , Insertion of Objects, Date and Time, Headers , Footers and Page Breaks, Auto Correct, Spelling and Grammar checking, Graphics , Templates and Wizards, Mail Merge: Meaning, purpose and advantages creating merged letters, mailing labels, envelops, Working with Tables.	10Hrs

UNIT-V	**MS POWERPOINT:** Features, Advantages and application of MS PowerPoint - parts of MS PowerPoint window-menus and tool bars creating presentations through auto content wizard, Design templates and Blank presentation, slide show-saving opening and closing a presentation-inserting editing and deleting slides-types of slides- slide layouts, Slide views-formatting-Inserting of objects and charts in slides- Custom animation and Transition.	10Hrs

LAB WORK-PRACTICALS

Window based Practical's MS WORD – Creating
Applications commerce oriented. MS – POWERPOINT - Practical applications - creation of presentations (commerce oriented).

Learning Materials

Text Books/Websites:

1.Microsoft Office by Sanjay Saxena
2. www.microsoft.com/
3. Fundamentals of Computers, 4/E : Rajaram, PHI
4. en.wikipedia.org/wiki/word processor
5. office.microsoft.com
6. Biradar and Sanaki ,computer Applications in Business-I
7.Ramgouda Patil, computer Applications in Business-I

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to	04
Internal Test 2:	80 marks reduced to	10
Attendance:		03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:		03

2. Semester End Examination as per University guidelines: 80 marks

Course: B.com IV Sem	**Computer Applications in Business-III (Lectures/Week:4)** **Facilitators: Mr. V M Bagi**	
UNIT-I	**BASICS OF PROGAMMING SKILLS:** Basics of Problem Solving, Programming Logic, Algorithms, Flowcharts.	10Hrs
UNIT-II	**C PROGRAMMING AND INTRODUCTION TO OOPS:** Principles of procedure oriented programming, Introduction to C language, Variables, Constants Operators and their hierarchy. Expressions, Tokens, I/O functions, Simple C programs, Decision making and Looping structures. Commerce oriented programs relating to branching and looping like interest, discount, and income tax calculation Arrays: Single Dimensional and Two Dimensional.	10Hrs

	Introduction to object oriented programming (OOP'S CONCEPT): Classes and Objects concept.	
UNIT-III	INTERNET: Introduction to internet, evolution of the Internet, Operation of the Internet, IP address and DNS, gateway, accessing internet, services provided by internet, Browsers and search engines, web, web site and web services, Internal security and Privacy, cyber crimes – cyber laws.	10Hrs
UNIT-IV	**INTERNET BANKING:** Introduction to Internet Banking, Computers and Commercial World, Telephone banking, Computerized corporate banking, Electronic funds transfer, importance of Cheques clearing, Magnetic Ink Character Recognition (MICR), RTGS, NEFT, Optical Mark Recognition, Computer output to Microphone (COM), Facsimile Transformation.	10Hrs
UNIT-V	**WEB BASED MARKETING:** Introduction & scope of marketing, marketing and information technology congruence, Advertising and marketing on the internet, Application of 4 P's(product, price, place and promotion) in internet, marketing supply chain management.	10Hrs

LAB WORK-PRACTICALS
Practical's on C Programming, Practical usage of internet- creating email accounts, Sending and receiving mails and multimedia tools.

Learning Materials
Text Books/Websites:

1. Microsoft Office 2007 professional
2. MS - Office - Sanjay Saxena
3. Raymond green hall - Fundamentals of the Internet, Tata McGraw Hill.
4. Biradar and Sanaki ,computer Applications in Business-III
5.Ramgouda patil, computer Applications in Business-III

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to	04
Internal Test 2:	80 marks reduced to	10
Attendance:		03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:		03

2. Semester End Examination as per University guidelines: 80 marks

Course: B.com VI Sem	**Computer Applications in Business-V (Lectures/Week:4)** **Facilitators: Shri. V. M. Bagi**	
UNIT-I	**Accounting Information System:** Basics of Accounting Practices and Preparation of Final Accounts, Introduction to Computerized Accounting Information Systems. Difference between Manual and Computerized Accounting Information Systems, Accounts Receivable System.	10Hrs

UNIT-II	**Fundamentals of computerized Accounting:** Computerized accounting v/s manual accounting, architecture & customization of tally, features of tally 9.1 version, configuration of tally, tally screens and menus, creation of company, creation of group, Editing and deleting groups , creation of ledgers, Editing and deleting ledgers. Introduction to vouchers, voucher entry, payment voucher, receipt voucher, contra voucher, journal voucher, Editing and deleting vouchers	10Hrs
UNIT-III	**Introduction to Inventories:** Creation of stock categories, Creation of stock groups, Creation of stock items, configuration and features of stock items, Editing and deleting stocks, usage of stocks in voucher entry. Purchase order-stock vouchers, sales order. Introduction to cost, creation of cost category, creation of cost centers, Editing and deleting cost centers& categories, usage of cost category & cost, centers in voucher entry, budget & control, , Editing and deleting budgets, generating & printing reports in detail & condensed format.	10Hrs
UNIT-IV	**Generation of Reports:** Day books- Balance sheet, Trial balance, Profit & loss account, ratio analysis, cash flow statement, fund flow statement, cost center report, inventory report, bank reconciliation statement	10Hrs
UNIT-V	**Multimedia:** Meaning and components of multimedia, Purpose, Usage and applications of multimedia. Introduction to multimedia tools Types and working of Input Devices like Scanner, Digital camera. Types and working of Output Devices like Monitors and Printers. Types and working of Storage Devices like CD-ROMS, DVD and Hard disk.	10Hrs

LAB WORK-PRACTICALS
Tally in detail

Learning Materials
Text Books/Websites:

1.Computer Applictions in Business- Dr S.V Srinivasa- Sultan Chand publication
2. E- Commerce- Dr Shivani Arora
3. E-commerce: A managerial perspective: Michael change
4. Multimedia Systems Design- Andleigh P.K & Thakrar K
5. Frontiers of E-commerce: Ravi Kalakota & A.B Whinston
6. www.amazon.com
7. Tally 9 by Dr. Namrata Agarwal
8. Tally 9 by Vishnupriya Singh.
9. Biradar and Sanaki ,computer Applications in Business-V

Assessment

Assessment is carried out as per the guidelines laid down and mandated by the affiliating University.

100 marks exam (20 IA + 80 Semester End Exam)

1. Two Internal Tests (IA): 20marks

Internal Test 1:	20 marks reduced to	04
Internal Test 2:	80 marks reduced to	10
Attendance:		03
Class seminars, Tutorials, Sports & Cultural Activities, Assignments, NSS/NCC:		03

2. Semester End Examination as per University guidelines: 80 marks

Practical

B.Sc-II Semester	**Programming Lab- Data Structures using C** **Practical Hours: 4 Hrs/week** **Facilitators: Miss V.K. Badiger, Miss T.R Patil** Write a C program to demonstrate the Dynamic Memory Allocation for Structure by reading and printing n student details. 2. Write a C program to read a one dimensional array, print sum of all elements along with inputted array elements using Dynamic Memory Allocation. 3. Write a C program to add two matrices using pointer to an array concept. 4. Write a program to sort array of integers using array of pointers concept. 5. Write a program that takes a file as an argument and counts the total number of lines. Lines are defined as ending with a newline character. Program usage should be count filename.txt and the output should be the line count. 6. Write a C program to read a text file and convert the file contents in capital (upper-case) and write the contents in an output file. 7. Write a C program to find n Fibonacci numbers using recursion. 8. Write a C program to find factorial of any number using recursion. 9. Write a C program to search for an element in an array using Sequential search 10. Write a C program to search for an element in an array using Binary search 11. Write a C program to sort a list of N elements using Bubble sort Technique 12. Write a C program to sort a list of N elements using Merge sort Technique 13. Write a C program to sort a list of N elements using Quick sort Technique 14. Write a C program to sort a list of N elements using Insertion sort Technique 15. Write a C program to demonstrate the working of stack of size N using an array. The elements of the stack may assume to be of type integer or real, the operations to be supported are 1. PUSH 2. POP 3. DISPLAY. The program should print appropriate messages for STACK overflow, Under flow and empty, use separate functions to detect these cases 16. Write a C program to simulate the working of an ordinary Queue using an array. Using dynamic variables and pointers Write a C program to construct a singly linked list 1. LINSERT Inserting a node in the front of the list 2. LDELETE Deleting the node based on Roll – No 3. LSEARCH Searching a node based on Roll-No 4. LDISPLAY displaying all the nodes in the list 18. Write a C program to implement stack operations using linked list. 19. Write a C program to evaluate postfix expression using stack. 20. Write a C program to convert infix expression to postfix expression using stack Practical Examination- 40 Marks Duration - 3 Hours. Certified Journal is compulsory for appearing Practical Examination Students shall be given two programming assignments taking into consideration of duration of the time allotted to students for writing, typing and executing the programs. Algorithm/program design : 15 Execution : 15 (includes program code correctness and correct execution results) Journal : 05 Viva-Voce : 05

B.Sc-IV Semester	**Operating Systems Lab** **Practical Hours: 4 Hrs/week** **Facilitators: Miss V.K. Badiger and Smt. T.R. Patil**
	Implement the following on LINUX or other Unix like platform. Use C for high level language implementation 1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir 2. Write programs using the I/O system calls of UNIX operating system (open, read,write, etc) 3. Write C programs to simulate UNIX commands like ls, grep, etc. 4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions) 5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions) 6. Developing Application using Inter Process communication (using shared memory, pipes or message queues) 7. Implement the Producer – Consumer problem using semaphores 8. Implement some memory management schemes – I, II 9. Implement any file allocation technique (Linked, Indexed or Contiguous)
	Assessment: Evaluation criteria for practical examinations shall be as follows: **1. Writing of Programs -15 Marks** a. One program from the journal list – 08 Marks b. Another program given by examiner based on the concepts studied -07Marks **2. Execution of programs – 15 Marks** a. Journal Program - 08 Marks b. Program of Examiner's Choice -07 Marks **3. Viva-Voce -05 Marks** **4. Journal / Laboratory Report – 5 Marks** **Total Marks -40 Marks**
B.Sc-VI Semester	**Data Communication and Network Lab.** **Practical Hours: 4 Hrs/week** **Facilitators: Miss S.M. Hegale and Shri. B.N Shivkumar**
	1. Program to connect two nodes 2. Program for connecting three nodes considering one node as a central node. 3. Program to implement star topology 4. Program to implement a bus topology. 5. Program for connecting multiple routers and nodes and building a hybrid topology. 6. Installation and configuration of NetAnim 7. Program to implement FTP using TCP bulk transfer. 8. Program for connecting multiple routers and nodes and building a hybrid topology and then calculating network performance 9. Performance comparison of Routing protocols using Simulation tool 10. To implement a GoBack-N ARQ(Automatic Repeat Request) protocol. 11. To implement sliding –window protocol. 12. Simulation of error correction code (like CRC) 13. Simulation of HTTP Protocol using TCP Sockets