RANI CHANNAMMA UNIVERSITY, BELAGAVI

PROGRAM /COURSE STRUCTURE AND SYLLABUS
as per the Choice Based Credit System (CBCS) designed in accordance with
Learning Outcomes-Based Curriculum Framework (LOCF)
of National Education Policy (NEP) 2020
for
BACHELOR OF COMPUTER APPLICATIONS (BCA)

w.e.f.

Academic Year 2021-22 and onwards

Board of Studies (UG) Committee (NEP-Bachelor of Computer Applications)

Bachelor of Computer Applications (BCA) Programme 2021-22

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PREAMBLE

Computer Application (CA) has been evolving as an important branch of science and technology in last two decade and it has carved out a space for itself like computer science and engineering. Computer application spans theory and more application and it requires thinking both in abstract terms and in concrete terms.The ever-evolving discipline of computer application has strong connections to other disciplines. Many problems in science, engineering, health care, business, and other areas can be solved effectively with computers and its applications, but finding a solution requires both computer science expertise and knowledge of the particular application domain.Computer science has a wide range of specialties. These include Computer Architecture, Software Systems, Graphics, Artificial Intelligence, Mathematical and Statistical Analysis, Data Science, Computational Science, and Software Engineering.

Universities and other HEIs introduced programmes of computer application. Information Technology is growing rapidly. Increasing applications of computers in almost all areas of human endeavour has led to vibrant industries with concurrent rapid change in technology. Unlike other basic disciplines, developing core competency in this discipline that can be reasonably stable becomes a challenge.In India, it was initially introduced at the Master (postgraduate) level as MCA and M.Tech. Later on, engineering programmes such as B.Tech and B.E in Computer Science & Engineering and in Information Technology were introduced in various engineering College/Institutions to cater to the growing demand for trained engineering manpower in IT industries.Parallelly, BCA, BSc and MSc programmes with specialisation in Computer Science were introduced to train manpower in this highly demanding area.

BCA and BCA (Hons) are aimed at undergraduate level training facilitating multiple career paths. Students so graduated, can take up postgraduate programmes in CS or MCA leading to research as well as R&D, can be employable at IT industries, or can

pursue a teaching profession or can adopt a business management career.BCA and BCA (Hons) aims at laying a strong foundation of computer application at an early stage of the career. There are several employment opportunities and aftersuccessful completion of BCA, graduating students can fetch employment directly in companies as programmer, Web Developer, Software Engineer, Network Administrator, Data Scientist, or AI/ML personnel.

The Program outcomes in BCA are aimed at allowing flexibility and innovation indesign and development of course content, in method of imparting training, in teaching learning process and in assessment procedures of the learning outcomes. The emphasis in BCA courses, in outcome-based curriculum framework, help students learn solving problems, accomplishing IT tasks, and expressing creativity, both individually and collaboratively. The proposed framework will help Students learn programming techniques and the syntax of one or more programming languages.

All students must, therefore, have access to a computer with a modern programming language installed. The computer science framework does not prescribe a specific language. The teacher and students will decide which modern programming languages students will learn. More importantly, students will learn to adapt to changes in programming languages and learn new languages as they are developed.

The present Curriculum Framework for BCA degrees is intended to facilitate the students to achieve the following.

- To develop an understanding and knowledge of the basic theory of Computer Science and Information Technology with good foundation on theory, systems and applications such as algorithms, data structures, data handling, data communication and computation

- To develop the ability to use this knowledge to analyse new situations in the application domain

- To acquire necessary and state-of-the-art skills to take up industry challenges. The objectives and outcomes are carefully designed to suit to the above-mentioned purpose.

- The ability to synthesize the acquired knowledge, understanding and experience for a better and improved comprehension of the real-life problems

- To learn skills and tools like mathematics, statistics and electronics to find the solution, interpret the results and make predictions for the future developments

- To formulate, to model, to design solutions, procedure and to use software tools to solve real world problems and evaluate

PROGRAM OUTCOMES:

By the end of the program the following outcomes will be achieved by the students:

1. **Discipline knowledge:** Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity

2. **Problem Solving:** Improved reasoning with strong mathematical ability to Identify, formulate and analyse problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.

3. **Design and Development of Solutions:** Ability to design and development of algorithmic solutions to real world problems and acquiring a minimum knowledge on statistics and optimization problems. Establishing excellent skills in applying various design strategies for solving complex problems.

4. **Programming a Computer**: Exhibiting strong skills required to program a computer for various issues and problems of day-to-day applications with thorough knowledge on programming languages of various levels.

5. **Application Systems Knowledge:** Possessing a sound knowledge on computer application software and ability to design and develop app for applicative problems.

6. **Modern Tool Usage:** Identify, select and use a modern scientific and IT tool or technique for modelling, prediction, data analysis and solving problems in the area of Computer Science and making them mobile based application software.

7. **Communication:** Must have a reasonably good communication knowledge both in oral and writing.

8. **Project Management:** Practicing of existing projects and becoming independent to launch own project by identifying a gap in solutions.

9. **Ethics on Profession, Environment and Society:** Exhibiting professional ethics to maintain the integrality in a working environment and also have concern on societal impacts due to computer-based solutions for problems.

10. **Lifelong Learning:** Should become an independent learner. So, learn to learn ability.

11. **Motivation to take up Higher Studies:** Inspiration to continue educations towards advanced studies on Computer Science.

By the end of the program the students will be able to:

The Bachelor of Computer Application (BCA (Hons)) program enables students to attain following additional attributes besides the afore-mentioned attributes, by the time of graduation:

1. Apply standard Software Engineering practices and strategies in real -time software projectdevelopment

2. Design and develop computer programs/computer -based systems in the areas related to AI, algorithms, networking, web design, cloud computing, IoT and data analytics.

3. Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existingproblems

4. The ability to apply the knowledge and understanding noted above to the analysis of a given information handlingproblem.

5. The ability to work independently on a substantial software project and as an effective teammember.

PROGRAM STRUCTURE

Proposed Curricular and Credits Structure under Choice Based Credit System [CBCS] of BCA with Discipline Scheme for the Four Years Computer Application BCA Undergraduate Honors Programmewith effect from 2021-22

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L-1	21BCA1L1LK1	Kannada	40	60	100	4	0	0	3	2
	21BCA1L1LFK1	Functional Kannada								
L-2	21BCA1L2LEN2	English	40	60	100	4	0	0	3	2
	21BCA1L2LHI2	Hindi								
	21BCA1L2LSN2	Sanskrit								
	21BCA1L2LTE2	Telugu								
	21BCA1L2LUR2	Urdu								
DSC1	21BCA1C1L	Programming in C	40	60	100	3	0	0	3	2
	21BCA1C1P	C Programming Lab	25	25	50	0	0	3	2	3
DSC2	21BCA1C2L	Fundamentals of Computers	40	60	100	3	0	0	3	2
	21BCA1C2P	Information Technology Lab	25	25	50	0	0	3	2	3
DSC3	21BCA1C3LMF	Mathematical Foundation*	40	60	100	3	0	0	3	2
	21BCA1C3LAC	Accountancy*								
OEC1	21BCA1O1CPL	C Programming Concepts	40	60	100	3	0	0	3	2
SEC1	21BCA1S1FD	Digital Fluency	25	25	50	1	0	2	2	2
VBC1	21BCA1V1PE1	Physical Education - Yoga	25	-	25	-	-	2	1	-
VBC2	21BCA1V2HW	Health & Wellness	25	-	25	-	-	2	1	-
Total Marks					**800**	**Semester Credits**			**26**	

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L-3	21BCA2L3LK2	Kannada	40	60	100	4	0	0	3	2
	21BCA2L3FKL2	Functional Kannada								
L-4	21BCA2L4EN2	English	40	60	100	4	0	0	3	2
	21BCA2L4HI2	Hindi								
	21BCA2L4SN2	Sanskrit								
	21BSC2L4TE2	Telugu								
	21BCA2L4UR2	Urdu								
DSC4	21BCA2C4L	Data Structures using C	40	60	100	3	0	0	3	2
	21BCA2C4P	Data Structures Lab	25	25	50	0	0	3	2	3
DSC5	21BCA2C5L	Object Oriented Concepts using Java	40	60	100	3	0	0	3	2
	21BCA2C5P	JAVA Lab	25	25	50	0	0	3	2	3
DSC6	21BCA2C6L	Discrete Mathematics	40	60	100	3	0	0	3	2
OEC2	21BCA2O2MPL	Web Designing	40	60	100	3	0	0	3	2
AECC1	21BCA2AE1L	Environmental Studies	20	30	50	1	0	2	2	2
VBC3	21BCA2V3PE2	Physical Education – Sports	25	-	25	-	-	2	1	-
VBC4	21BCA2V4NC1	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
Total Marks			**800**			**Sem Credits**			**26**	
Exit option with Certificate in Computer Applications (with the completion of courses equivalent to a minimum of 48 credits)			**1600**			**I year Credits**			**52**	

SEMESTER-2

SEMESTER-3										
Category	**Course code**	**Title of the Paper**	**Marks**			**Teaching hours/week**			**Credit**	**Duration of exams (Hrs)**
			IA	SEE	Total	L	T	P		
L-5	21BCA3L5LK3	Kannada	40	60	100	4	0	0	3	2
	21BCA3L5LFK3	Functional Kannada								
L-6	21BCA3L6EN3	English	40	60	100	4	0	0	3	2
	21BCA3L6HI3	Hindi								
	21BCA3L6SN3	Sanskrit								
	21BSC3L6TE3	Telugu								
	21BCA3L6UR3	Urdu								
DSC7	21BCA3C7L	Database Management System	40	60	100	3	0	0	3	2
	21BCA3C7P	DBMS Lab	25	25	50	0	0	3	2	3
DSC8	21BCA3C8L	C# and .Net Framework	40	60	100	3	0	0	3	2
	21BCA3C8P	C# and .Net Framework Lab	25	25	50	0	0	3	2	3
DSC9	21BCA3C9L	Computer Communication and Networks	40	60	100	3	0	0	3	2
OEC3	21BCA3O3RPL	E-Commerce	40	60	100	3	0	0	3	2
SEC2	21BCA3SE2AI	Artificial Intelligence	25	25	50	1	0	2	2	2
VBC5	21BCA3V5PE3	Physical Education – Sports	25	-	25	-	-	2	1	-
VBC6	21BCA3V6NC2	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
Total Marks					**800**	**Semester Credits**			**26**	

Category	Course code	Title of the Paper	Marks			Teaching hours/week			Credit	Duration of exams (Hrs)
			IA	SEE	Total	L	T	P		
L-7	21BCA4L7LK4	Kannada	40	60	100	4	0	0	3	2
	21BCA4L7LFK4	Functional Kannada								
L-8	21BCA4L8EN4	English	40	60	100	4	0	0	3	2
	21BCA4L8HI4	Hindi								
	21BCA4L8SN4	Sanskrit								
	21BSC4L8TE4	Telugu								
	21BCA4L8UR4	Urdu								
DSC10	21BCA4C10L	Python Programming	40	60	100	3	0	0	3	2
	21BCA4C10P	Python Programming Lab	25	25	50	0	0	3	2	3
DSC11	21BCA4C11L	Multimedia & Animation	40	60	100	3	0	0	3	2
	21BCA4C11P	Multimedia & Animation Lab	25	25	50	0	0	3	2	3
DSC12	21BCA4C12L	Operating System Concepts	40	60	100	3	0	0	3	2
OEC4	21BCA4O4ECL	Multimedia & Animation	40	60	100	3	0	0	3	2
AECC2	21BCA4AE2CIL	Constitution of India	20	30	50	1	0	2	2	2
VBC7	21BCA4V7PE4	Physical Education – Sports	25	-	25	-	-	2	1	-
VBC8	21BCA4V8NC3	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
Total Marks					**800**	**Semester Credits**			**26**	
Exit option with Diploma in Computer Applications (with the completion of courses equivalent to a minimum of 96 credits)					**3200**	**II year Credits**			**104**	

SEMESTER-5										
Category	**Course code**	**Title of the Paper**	**Marks**			**Teaching hours/week**			**Credit**	**Duration of exams (Hrs)**
			IA	SEE	Total	L	T	P		
DSC13	21BCA5C13L	Internet Technologies	40	60	100	3	0	0	3	2
	21BCA5C13P	Internet Technology Laboratory	25	25	50	0	0	3	2	3
DSC14	21BCA5C14L	Statistical Computing and R Programming	40	60	100	3	0	0	3	2
	21BCA5C14P	R Programming Lab	25	25	50	0	0	3	2	3
DSC15	21BCA5C15L	Software Engineering	40	60	100	3	0	0	3	2
DSE1	21BCA5DE1AL	Information Security & Cryptography	40	60	100	3	0	0	3	2
	21BCA5DE1BL	Cloud Computing								
	21BCA5DE1CL	Business Intelligence								
VC1	21BCA5VC1AL	Unix & Shell Programming	40	60	100	3	0	0	3	2
	21BCA5VC1BL	Web Content Management								
SEC3	21BCA5SE3L	Cyber Security	25	25	50	1	0	2	2	2
VBC9	21BCA5V7PE5	Physical Education – Sports	25	-	25	-	-	2	1	-
VBC10	21BCA5V8NC4	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
Total Marks					**700**	**Semester Credits**			**23**	

SEMESTER-6										
Category	**Course code**	**Title of the Paper**	**Marks**			**Teaching hours/week**			**Credit**	**Duration of exams (Hrs)**
			IA	**SEE**	**Total**	**L**	**T**	**P**		
DSC16	21BCA6C16L	PHP and MySQL	40	60	100	3	0	0	3	2
	21BCA6C16P	PHP and MySQL LAB	25	25	50	0	0	3	2	3
DSC17	21BCA6C17L	Artificial Intelligence and Applications	40	60	100	3	0	0	3	2
DSC18	21BCA6C18P	Project Work	50	100	150	0	0	10	5	3
INT	21BCA6INT1	Internship	50	-	50			-	2	-
DSE2	21BCA6DE2AL	Fundamentals of Data Science	40	60	100	3	0	0	3	2
	21BCA6DE2BL	Mobile Application Development								
	21BCA6DE2CL	Embedded Systems								
VC2	21BCA6VC2AL	Health Care Technologies	40	60	100	3	0	0	3	2
	21BCA6VC2BL	Digital Marketing								
SEC4	21BCA6SE4L	Professional Communication	25	25	50	1	0	2	2	2
VBC11	21BCA6V7PE6	Physical Education – Sports	25	-	25	-	-	2	1	-
VBC12	21BCA6V8NC5	NCC/NSS/R&R(S&G) / Cultural	25	-	25	-	-	2	1	-
Total Marks			**750**			**Semester Credits**			**25**	
Exit Option with Bachelor of Computer Applications Degree, BCA Degree (with completion of courses equivalent to a minimum of 140 credits)			**4650**			**Total Credits for BCA Program**			**152**	

Concept Note, Abbreviation Explanation and Coding:

Concept Note:

1. CBCS is a mode of learning in higher education which facilitates a student to have some freedom in selecting his/her own choices, across various disciplines for completing a UG/PG program.
2. A credit is a unit of study of a fixed duration. For the purpose of computation of workload as per UGC norms the following is mechanism be adopted in the university:
   One credit (01) = One Theory Lecture (L) period of one (1) hour.
   One credit (01) = One Tutorial (T) period of one (1) hour.
   One credit (01) = One practical (P) period of two (2) hours.

3. Course: paper/subject associated with AECC, DSC, DSEC, SEC, VBC, OEC, VC, IC, MIL.

4. Wherever there is a practical there will be no tutorial and vice-versa

5. Vocational course is a course that enables individual to acquire skills set that are required for a particular job.

6. Internship is a designated activity that carries some credits involving more than 25 days of working in an organization (either in same organization or outside) under the guidance of an identified mentor. Internship shall be an integral part of the curriculum.

7. OEC: For non- Computer Science students. Computer Science students have to opt for OEC from departments other than their disciplines

Abbreviation Explanations:

1. AECC: Ability Enhancement Compulsory Course.

2. DSC: Discipline Specific Core Course.

3. DSEC: Discipline Specific Elective Course.

4. SEC: Skill Enhancement Course.

5. VBC: Value Based Course.

6. OEC: Open/Generic Elective Course

7. VC: Vocational Course.

8. IC: Internship Course

9. L1:   Language One

10. L2:   MIL

11. L=   Lecture; T= Tutorial; P=Practical.

12. MIL= Modern Indian Language; English or Hindi or Telugu or Sanskrit or Urdu

Program Coding:

1. Code 21: Year of Implementation

2. Code BCA: BCA Program under the faculty of Applied Science of the University

3. Code 1: First Semester of the Program, (2 to 6 represent higher semesters)

4. Code A: AECC, (C for DSC, S for SEC, V for VBC and O for OEC)

5. Code 1: First "AECC" Course in semester, similarly in remaining semester for such other courses

6. Code LK: Language Kannada, FK for Functional Kannada, similarly Language English, Language Hindi, Language Sanskrit, &Language Urdu

7. Code 1: Course in that semester.

COURSE-WISE SYLLABUS

Semester I

Year	I	Course Code: 21BCA1C2L	Credits	03
Sem.	I	Course Title: Fundamentals of Computers	Hours	40
Course Pre-requisites, if any:		NA		
Formative Assessment Marks: 40		Summative Assessment Marks: 60	Duration of ESA: 02 hrs.	
Course Outcomes		At the end of the course the student should be able to: 1. Create an awareness of computers its classification and anatomy 2. Understand Number systems , Computer Languages and the steps for problem solving 3. Understand the fundamentals of operating systems and basic commands 4. Understand basic concepts of DBMS and Internet		
Unit No.		Course Content	Hours	
Unit I		**Fundamentals of Computers:** Introduction to Computers - Computer Definition, Characteristics of Computers, Evolution and Generations of Computers, Basic Organisation of a Digital Computer; Functions & Components of a Computer, Central Processing Unit, Microprocessor, Storage units, Input and output Devices. How CPU and memory works.Classification of Digital Computer Systems: Microcomputers, Minicomputers, Mainframes, Super computers	10	-
Unit II		**Number Systems** – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII; Boolean Algebra – Boolean Operators with Truth Tables; **Computer Languages** - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program – Algorithm and Flowchart with Examples.	10	
Unit III		**Operating System Fundamentals:** Operating Systems: Introduction, Functions of an operating System, Classification of Operating Systems, System programs, Application programs, Utilities, The Unix	10	

	Operating System, Basic Commands (cal, date, bc, echo, who, ls, pwd, cd, mkdir, rmdir), Commands to work with file (cat, cp, rm, mv, file, wc, head, tail)	
Unit IV	**Introduction to Database Management Systems:** Database, DBMS, Why Database -File system vs DBMS, Database applications, Database users, Introduction to SQL, Classification of SQL-DDL, DML, DCL**Internet Basics:** Introduction, Features of Internet, Internet application, Services of Internet, Logical and physical addresses, Internet Service Providers, Domain Name System.**Web Basics:** Introduction to web, web browsers, http/https, URL.	10
Print Resources	1. Pradeep K. Sinha and PritiSinha: Computer Fundamentals (Sixth Edition), BPB Publication 2. David Riley and Kenny Hunt, Computational thinking for modern solver, Chapman &Hall/CRC, 3. J. Glenn Brook shear," Computer Science: An Overview", Addision-Wesley, Twelth Edition, 4. R.G. Dromey, "How to solve it by Computer", PHI,	

Year	I	**Course Code:** 21BCA1C2P	**Credits**	02
Sem.	I	**Course Title:** Information Technology Lab	**Hours**	40
Course Pre-requisites, if any:		NA		
Formative Assessment Marks: 25		Summative Assessment Marks: 25	Duration of ESA: 02hrs.	

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Part A: Hardware

1. Identification of the peripherals of a computer, components in a CPU and their functions.
2. Assembling and disassembling the system hardware components of personal computer.
3. Basic Computer Hardware Trouble shooting.
5. LAN and WiFi Basics.
6. Operating System Installation – Windows OS, UNIX/LINUX, Dual Booting.
7. Installation and Uninstallation of Software – Office Tools, Utility Software (like Anti-Virus, System Maintenance tools); Application Software - Like Photo/Image Editors, Audio Recorders/Editors, Video Editors ...); Freeware, Shareware, Payware and Trialware; Internet Browsers, Programming IDEs,
8. System Configuration – BIOS Settings, Registry Editor, MS Config, Task Manager, System Maintenance, Third-party System Maintenance Tools (Similar to CCleaner and Jv16 PowerTools)

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Part B: Software

1. Activities using Word Processor Software
2. Activities using Spreadsheets Software
3. Activities using Presentation Software
4. Activities involving Multimedia Editing (Images, Video, Audio)
5. Tasks involving Internet Browsing
6. Flow charts: Installation and using of flowgarithms software for different arithmetic tasks like sum, average, product, difference, quotient and remainder of given numbers, calculate area of Shapes (Square, Rectangle, Circle and Triangle), arrays and recursion.

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	Note: Use any open source software to execute the above assignments.

Reference:

1. Computational Thinking for the Modern Problem Solver, By Riley DD, Hunt K.A CRC press, 2014

2. Ferragina P, Luccio F. Computational Thinking: First Algorithms, Then Code. Springer

Web References:

http://www.flowgorithm.org/documentation/

Evaluation Scheme for Information Technology Lab Examination

Assessment Criteria		Marks
Activity – 1 from Part A	Write up on the activity/ task	3
	Demonstration of the activity/ task	07
Activity-2 from Part B	Write up on the activity/ task	3
	Demonstration of the activity/ task	07
Viva Voice based on Lab Activities		05
Total		**25**

Year	I	**Course Code:**21BCA1C1L	**Credits**	03
Sem.	I	**Course Title:** Programming in C	**Hours**	40
Course Pre-requisites, if any		NA		
Formative Assessment Marks: 40		Summative Assessment Marks: 60	Duration of ESA: 02 hrs.	
Course Outcomes		At the end of the course the student should be able to: 1. Read, understand and trace the execution of programs written in C language 2. Apply programming control structures for a given problem to create C code 3. Understand derived datatypes and develop C code using arrays/ strings 4. Understand user defined functions and datatypes to develop C code		
Unit No.		**Course Content**		**Hours**
Unit I		**Introduction to C Programming:** Overview of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C.**C Programming Basic Concepts:** C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants.**Input and output with C:** Formatted I/O functions - printf and scanf, control stings and escape sequences, output specifications with printf functions; Unformatted I/O functions to read and display single character and a string - getchar, putchar, gets and puts functions.		10
Unit II		**C Operators & Expressions:** Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associatively; Evaluation of arithmetic expressions; Type conversion.**Control Structures:** Decision making Statements - Simple if, if_else, nested if_else, else_if ladder, Switch Case, goto, break & continue statements; Looping. Statements - Entry controlled and exit controlled statements, while, do-while, for loops, Nested loops.		10

Unit III	**Derived data types in C:** Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation.**Strings:** Declaring & Initializing string variables; String handling functions - strlen, strcmp, strcpy and strcat; Character handling functions - toascii, toupper, tolower, isalpha, isnumeric etc.	08
Unit IV	**User Defined Functions:** Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type.**User defined data types:** Structures - Structure Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, comparing structure variables, Array of Structures; Unions - Union definition; difference between Structures and Unions.	12
	Recommended Learning Resources	
Print Resources	1. C: The Complete Reference, By Herbert Schildt. 2. C Programming Language, By Brain W. Kernighan 3. Kernighan & Ritchie: The C Programming Language (PHI) 4. P. K. Sinha&PritiSinha: Computer Fundamentals (BPB) 5. E. Balaguruswamy: Programming in ANSI C(TMH) 6. Kamthane: Programming with ANSI and TURBO C (Pearson Education) 7. V. Rajaraman: Programming in C (PHI –EEE) 8. S. Byron Gottfried: Programming with C(TMH) 9. YashwantKanitkar: Let us C 10. P.B. Kottur: Programming in C (Sapna Book House)	

Year	I	**Course Code:** 21BCA1C1P	**Credits**	02
Sem.	I	**Course Title:** Lab: C Programming	**Hours**	40
Course Pre-requisites, if any:		NA		
Formative Assessment Marks: 25		Summative Assessment Marks: 25	Duration of ESA: 02 hrs.	

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Part A:

1. Program to read radius of a circle and to find area and circumference
2. Program to read three numbers and find the biggest of three
3. Program to demonstrate library functions in math.h
4. Program to generate the factorial of a given number
5. Program to generate n fibonacii sequence
6. Program to read a number, find the sum of the digits, reverse the number and check it for palindrome
7. Program to read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers
8. Program to read percentage of marks and to display appropriate message (demonstration of switch Case statement)
9. Program to find the roots of quadratic equation (Demonstration of else-if ladder)
10. Program to read marks scored by a students and find the average of marks
11. Program to remove Duplicate Element in a single dimensional Array

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Part B:

1. Program to Swap Two Numbers
2. Program to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters.
3. Program to Reverse a string without using built in function
4. Program to find the length of a string without using built in function
5. Program to demonstrate string functions.
6. Program to read, display and to find the trace of a square matrix

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</table>

	7. Program to perform addition and subtraction of Matrices
	8. Program to read, display and multiply two m x n matrices using functions
	9. Program to check a number for prime by defining isprime( ) function
	10. Program to demonstrate student structure to read & display records of n students.
	11. Program to demonstrate the difference between structure & union.

Note: Student has to execute a minimum of 10 programs in each part to complete the Lab course

Evaluation Scheme for Lab Examination

Assessment Criteria		Marks
Program – 1 from Part A	Writing the Program	03
	Execution and Formatting	07
Program -2 from Part B	Writing the Program	03
	Execution and Formatting	07
Viva Voice		05
Total		**25**

Year	I	**Course Code:** 21BCA1C3LMF		**Credits**	03
Sem.	I	**Course Title:** Mathematical Foundation		**Hours**	40
Course Pre-requisites, if any	NA				
Formative Assessment Marks: 40	Summative Assessment Marks:: 60		Duration of ESA: 02 hrs.		
Course Outcomes	At the end of the course the student should be able to: 1. Study and solve problems related to connectives, predicates and quantifiers under different situations. 2. Develop basic knowledge of matrices and to solve equations using Cramer'srule. 3. Know the concept of Eigenvalues. 4. To develop the knowledge about derivatives and know various applications of differentiation. 5. Understand the basic concepts of Mathematical reasoning, set and functions				
Unit No.	**Course Content**				**Hours**
Unit I	**Basic concepts of set theory:** Mathematical logic introduction statementsConnectives-negation, Conjunction, disjunctionstatement formulas and truth tables- conditional and bi Conditional statements- tautology contradiction- equivalence of formulas-duality law-Predicates and Quantifiers, Arguments.				10
Unit II	**Operations on sets**: power set- Venn diagram Cartesian product-relations - functions- types of functions - composition of functions.				10
Unit III	**Matrix algebra:** Introduction-Types of matrices- matrix operations- transpose of a matrix - determinant of matrix - inverse of a matrix- Cramer's rule. **Matrix:** finding rank of a matrix - normal form-echelon form Cayley Hamilton theorem-Eigen values				12
Unit IV	**Differential calculus:** Functions and limits – Simple Differentiation of Algebraic Functions – Evaluation of First and Second Order Derivatives – Maxima and Minima				08

	Recommended Learning Resources
Print Resources	1. P. R. Vittal-Business Mathematics and Statistics, Margham Publications, Chennai B. S. Vatsa-Discrete Mathematics –New Age International Limited Publishers, New Delhi

Year	I	**Course Code:** 21BCA1C3LAC		**Credits**	03
Sem.	I	**Course Title:** Accountancy		**Hours**	40
Course Pre-requisites, if any	NA				
Formative Assessment Marks: 40	Summative Assessment Marks: 60			Duration of ESA: 02 hrs.	
Course Outcomes	At the end of the course the student should be able to: 1. Study and understand Accounting, systems of Book, Branches of accounting advantage and limitations 2. Know the concept of accounting, financial accounting process and Journalization 3. Maintenance different account book and reconciliations 4. Preparations of different bills, and trial balance.				

Unit No.	Course Content	Hours
Unit I	**Introduction:** History and Development of Accounting, Meaning, Objectives and functions of Accounting, Book keeping V/s Accounting, Users of accounting data, systems of book keeping and accounting, branches of accounting, advantages and limitations of accounting	08
Unit II	**Accounting Concepts and Convention:** Meaning, need and classification, accounting standards meaning, need and classification of Indian accounting standards. Accounting principles V/s accounting standard.Financial Accounting Process: Classification of accounting transactions and accounts, rules of debit and credit as per Double Entry System. Journalization and Ledger posting.	10
Unit III	**Preparation of Different Subsidiary Books:** Purchase Day book Sales Day Book, Purchase Returns Day Book, Sales Returns Day Book, Cash Book. Bank Reconciliation Statement: Meaning, Causes of Difference, Advantages, Preparation of Bank Reconciliation Statements.	10
Unit IV	**Account Procedure:** Honor of the Bill, Dishonor of the Dill, Endorsement, Discounting, Renewal, Bill for collection, Retirement of the Bill, Accommodation Bills, Bill Receivable Book and Payable Book. Preparation of Trial Balance: Rectification of errors and Journal Proper.**Preparation of Final Accounts:** Meaning, need and classification, Preparation of Manufacturing, Trading, Profit and loss account and Balance – Sheet of sale- traders and partnership firms.	12

	Recommended Learning Resources
Print Resources	**Reference Books:** 1. S. Ramesh, B.S. Chandrashekar, A Text Book of Accountancy. 2. V.A. Patil and J.S. Korlahalli, Book – keeping and accounting, (R. Chand and Co.Delhi). 3. R.S.Singhal, Principles of Accountancy,(NageenPrakashpvt.Lit.Meerut). 4. M.B.Kadkol, Book–Keeping and Accountancy, (RenukaPrakashan, Hubil) 5. Vithal, Sharma: Accounting for Management, Macmillan Publishers, Mumbai. 6. B B.S. Raman, Accountancy, (United Publishers, Mangalore). 7. Tulsian, Accounting and Financial Management – I:Financial Accounting – Person Education

OPEN-ELECTIVE SYLLABUS :

Year	I	**Course Code:** 21BCA1O1CPL	**Credits**	03
Sem.		**Course Title: C programming Concepts**	**Hours**	40
Course Pre-requisites, if any	NA			
Formative Assessment Marks: 40	Summative Assessment Marks: 60		Duration of ESA:..32hrs.	
Course Outcomes	At the end of the course the student should be able to: 1. Read, understand and trace the execution of programs written in C language 2. Apply programming control structures for a given problem to create C code 3. Understand derived datyes and develop C code using arrays/ strings 4. Understand user defined functions and datatypes to develop C code			
Unit No.	**Course Content**		**Hours**	
Unit I	**Introduction to C Programming:** Overview of C; History and Features of C; Structure of a C Program with Examples; Creating and Executing a C Program; Compilation process in C. **C Programming Basic Concepts:** C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants. **Input and output with C:** Formatted I/O functions - *printf* and *scanf,* control stings and escape sequences, output specifications with *printf* functions; Unformatted I/O functions to read and display single character and a string - *getchar, putchar, gets* and *puts* functions **C**		10	
Unit II	**Operators & Expressions:** Arithmetic operators; Relational operators; Logical operators; Assignment operators; Increment & Decrement operators; Bitwise operators; Conditional operator; Special operators; Operator Precedence and Associatively; Evaluation of arithmetic expressions; Type conversion. **Control Structures:** Decision making Statements - Simple if, if_else, nested if_else, else_if ladder, Switch Case, goto, break &continue statements;Looping Statements - Entry controlled and exit controlled		10	

	statements, while, do-while, for loops, Nested loops.	
Unit III	**Derived data types in C:** Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays - Declaration, Initialization and Memory representation.**Strings:** Declaring & Initializing string variables; String handling functions - strlen, strcmp, strcpy and strcat; Character handling functions - toascii, toupper, tolower, isalpha, isnumericetc	10
Unit IV	**User Defined Functions:** Need for user defined functions; Format of C user defined functions; Components of user defined functions - return type, name, parameter list, function body, return statement and function call; Categories of user defined functions - With and without parameters and return type.	10
	Recommended Leaning Resources	
Print Resources	**Reference Books:** 1. C: The Complete Reference, By HerbertSchildt. 2. C Programming Language, By Brain W.Kernighan 3. Kernighan & Ritchie: The C Programming Language(PHI) 4. E. Balaguruswamy: Programming in ANSI C(TMH) 5. Kamthane: Programming with ANSI and TURBO C (PearsonEducation) 6. V. Rajaraman: Programming in C (PHI –EEE) 7. S. Byron Gottfried: Programming with C(TMH) 8. YashwantKanitkar: Let usC 9. P.B. Kottur: Programming in C (SapnaBookHouse)	

Semester II

Year	I	**Course Code:** 21BCA2C4L		**Credits**	03
Sem.	II	**Course Title:**Data Structures using C		**Hours**	40
Course Pre-requisites, if any		Knowledge of Programming			
Formative Assessment Marks: 40		Summative Assessment Marks: 60		Duration of ESA: 02 hrs.	
Course Outcomes		At the end of the course the student should be able to: 1. Understand the classification of data structures and dynamic memory allocation 2. Understand the difference between iteration and recursion and apply recursive definition for problem solving 3. Understand and evaluate the applications of stacks and queues 4. Understand and evaluate the applications of linked lists and tree			
Unit No.		**Course Content**		**Hours**	
Unit I		**Introduction to data structures:** Definition; Types of data structures - Primitive & Non-primitive, Linear and Non-linear; Operations on data structures. Dynamic memory allocation: Static & Dynamic memory allocation; Memory allocation and de-allocation functions - malloc, calloc, realloc and free.**Pointers in C:** Understanding pointers - Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays; Pointer Arithmetic; Advantages and disadvantages of using pointers;		08	
Unit II		**Recursion:** Definition; Types of recursions; Recursion Technique Examples - GCD, Binomial coefficient nCr, Towers of Hanoi; Comparison between iterative and recursive functions.**Sorting and Searching:** Arrays as abstract data types, Representation of linear arrays in memory, Traversing linear arrays; Inserting and deleting elements; Sorting – Selection sort, Bubble sort, Quick sort, Selection sort, Insertion sort; Searching - Sequential Search, Binary search; Iterative and Recursive searching		10	

Unit III	**Stacks:** Basic Concepts – Definition and Representation of stacks; Operations on stacks – Push, Pop; Applications of stacks; Infix, postfix and prefix notations; Conversion from infix to postfix using stack; Evaluation of postfix expression using stack; Application of stack in function calls.**Queues:** Basic Concepts – Definition and Representation of queues; Types of queues, - Simple queues, Circular queues, Double ended queues, Priority queues; Operations on Simple queues;	10
Unit IV	**Linked list:** Basic Concepts – Definition and Representation of linked list, Types of linked lists - Singly linked list, Doubly linked list, Circular linked list Doubly Circular Linked list; Representation of Linked list in Memory;Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion;**Trees:** Definition; Tree terminologies –node, root node, parent node, ancestors of a node, siblings, terminal & non-terminal nodes, degree of a node, level, edge, path, depth; **Binary tree:** Type of binary trees - strict binary tree, complete binary tree, binary search tree and heap tree; Array representation of binary tree. Traversal of binary tree; preorder, in order and post order traversal.	12
	Recommended Learning Resources	
Print Resources	1. Ellis Horowitz and SartajSahni: Fundamentals of Data Structures 2. Tanenbaum: Data structures using C (Pearson Education) 3. Kamathane: Introduction to Data structures (Pearson Education) 4. Y. Kanitkar: Data Structures Using C(BPB) 5. Kottur: Data Structure Using C 6. Padma Reddy: Data Structure Using C	

Year	I	**Course Code:** 21BCA2C4P	**Credits**	02
Sem.	II	**Course Title:** Lab: Data Structures	**Hours**	40
Course Pre-requisites, if any:		Knowledge of Programming		
Formative Assessment Marks: 25		Summative Assessment Marks: 25	Duration of ESA: 02 hrs.	
		### Part A: 1. Program to find GCD using recursive function 2. Program to generate binomial coefficient using recursive function. 3. Program to generate n Fibonacci numbers using recursive function. 4. Program to implement Towers of Hanoi using recursion. 5. Program to implement dynamic array, find smallest and largest element of the array. 6. Program to read the names of cities and arrange them alphabetically. 7. Program to sort the given list using selection sort technique. 8. Program to sort the given list using bubble sort technique. 9. Program to sort the given list using insertion sort technique.		
		### Part B: 1. Program to sort the given list using quick sort technique. 2. Program to sort the given list using merge sort technique. 3. Program to search an element using linear search technique. 4. Program to search an element using binary search technique. 5. Program to implement Stack. 6. Program to convert an infix expression to postfix. 7. Program to implement simple queue. 8. Program to implement linear linked list. 9. Program to display in-order traversal of a binary tree.		

Year	I	**Course Code:** 21BCA2C5L		**Credits**	03
Sem.	II	**Course Title:** Object Oriented Programming with JAVA		**Hours**	40
Course Pre-requisites, if any		Knowledge of Programming			
Formative Assessment Marks: 30		Summative Assessment Marks: 70		Duration of ESA: 03 hrs.	
Course Outcomes		At the end of the course the student should be able to: 1. Understand the features of Java and the architecture of JVM 2. Write, compile, and execute Java programs that may include basic data types and control flow constructs and how type casting is done 3. Identify classes, objects, members of a class and relationships among them needed for a specific problem and demonstrate the concepts of polymorphism and inheritance 4. The students will be able to demonstrate programs based on interfaces and threads and explain the benefits of JAVA's Exceptional handling mechanism compared to other Programming Language 5. Write, compile, execute Java programs that include GUIs and event driven programming and also programs based on files			
Unit No.		**Course Content**		**Hours**	
Unit I		**Introduction to Java:** OOPs concepts, Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Arrays in java. **Objects and Classes:** Basics of objects and classes in java, Methods and objects,Instance of operator, Visibility modifiers, Method Overloading, Constructors, Static Members, Inbuilt classes like String, Character, String Buffer, this reference.		12	
Unit II		**Inheritance and Polymorphism:** Inheritance in java, Super and sub class, Types of inheritance, Overriding, Polymorphism, Dynamic binding, Abstract class, Interface in java, Packages in java - defining and importing user defined packages.		08	
Unit III		**Event and GUI programming:** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout,		10	

	Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, TextFields, Text Areas, Combo Boxes, Lists, Windows, Menus.	
Unit IV	**Multithreading in java:** Thread life cycle and methods, Runnable interface, Thread priorities, Exception handling mechanism with try catch-finally, Introduction to JavaBeans.**I/O programming:** Java Input Output: Java IO package, File, Byte/Character Stream, File reader / writer	10
	Recommended Learning Resources	
Print Resources	**Reference Books:** - Java, By E Balagurusamy – A Primer, Fourth Edition, Tata McGraw Hill Education Private Limited. - Core Java Volume I – Fundamentals, By Cay S. Horstmann, PrenticeHall - Object Oriented Programming with Java : Somashekara, M.T., Guru, D.S., Manjunatha,K.S - Java 2 - The Complete Reference – McGraw Hillpublication. - Java - The Complete Reference, 7th Edition, By Herbert Schildt– McGraw Hill publication.	

Year	I	**Course Code:** 21BCA2C5P	**Credits**	02
Sem.	II	**Course Title:** Lab: JAVA	**Hours**	40
Course Pre-requisites, if any:		Knowledge of Programming		
Formative Assessment Marks: 25		Summative Assessment Marks: 25	Duration of ESA: 02 hrs.	

<div align="center"><u>**Practice Labs**</u></div>

1. Program to print the following triangle of numbers

       1

       1 2

       1 2 3

       1 2 3 4

       1 2 3 4 5

2. Program to simple java application, to print the message, "Welcome to java"

3. Program to display the month of a year. Months of the year should be held in an array.

4. Program to find the area of rectangle.

5. program to demonstrate a division by zero exception

6. Program to create a user defined exception say Pay Out of Bounds.

<u>**Part A: Programming Lab – Java Fundamentals – OOPS in JAVA**</u>

1. Program to assign two integer values to X and Y. Using the 'if' statement the output of the program should display a message whether X is greater than Y.

2. Program to list the factorial of the numbers 1 to 10. To calculate the factorial value, use while loop. (Hint: Fact of 4 = 4*3*2*1)

3. Program to find the area and circumference of the circle by accepting the radius from the user.

4. Program to add two integers and two float numbers. When no arguments are supplied, give a default value to calculate the sum. Use function overloading.

5. Program to perform mathematical operations. Create a class called AddSub with methods to add and subtract. Create another class called MulDiv that extends from AddSub class

	to use the member data of the super class. MulDiv should have methods to multiply and divide A main function should access the methods and perform the mathematical operations.
	
	6. Program with class variable that is available for all instances of a class. Use static variable declaration. Observe the changes that occur in the object's member variable values.
	
	7. Program to create a student class with following attributes; Enrollment No: Name, Mark of sub1, Mark of sub2, mark of sub3, Total Marks. Total of the three marks must be calculated only when the student passes in all three subjects. The passing mark for each subject is 50. If a candidate fails in any one of the subjects his total mark must be declared as zero. Using this condition write a constructor for this class. Write separate functions for accepting and displaying student details. In the main method create an array of three student objects and display the details.
	
	8. Write a program to demonstrate multiple inheritance and use of Implementing Interfaces
	
	9. Illustrate creation of thread by
	
	   a) Extending Thread class. b) Implementing Runnable Interfaces
	
	10. Write a program to demonstrate multiple inheritance and use of iimplementing Interfaces.
	
	11. Create a package 'BCA' in your current working directory.
	
	   a. Create a class student in the above package with the following attributes: Name, age, gender. Include appropriate constructor and a method for displaying the details.
	
	   b. Import above package and access the member variables and function contained in a package.

	PART B: Exception Handling & GUI Programming 1. Program to catch Negative Array Size Exception. This exception is caused when the array size is initialized to negative values. 2. Program to demonstrate exception handling with try, catch and finally. 3. Program which create and displays a message on the window 4. Program to draw several shapes in the created window 5. Programto create a 4×4 grid and fills it in with 15 buttons, each 1. labeled with its index.

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6. Program which creates a frame with two buttons father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother button similar details of mother also appear.
7. Create a frame which displays your personal details with respect to a button click
8. Program to create a window with TextFields and Buttons. The "ADD" button adds the two integers and display the result. The "CLEAR" button shall clear all the text fields.
9. Program to create a window, when we press M or m, the window displays "good morning", A or a, the window display's Good Afternoon" , E or e, the window displays "good morning", N or n, the window displays "good morning"
10. Demonstrate the various mouse handling events using suitable example.
11. Program to create menu bar and pull-down menus.

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Note: Student has to execute a minimum of 10 programs in each part to complete the Lab course

Evaluation Scheme for Data Structures and Java Lab Examination

Assessment Criteria		Marks
Program – 1 from Part A	Writing the Program	03
	Execution and Formatting	07
Program -2 from Part B	Writing the Program	03
	Execution and Formatting	07
Viva Voice		05
Total		**25**

Year	I	**Course Code:** 21BCA2C6L	**Credits**	04
Sem.	II	**Course Title:** Discrete Mathematics	**Hours**	40
Course Pre-requisites, if any		NA		
Formative Assessment Marks: 40		Summative Assessment Marks: 60	Duration of ESA: 02 hrs.	
Course Outcomes		1. At the end of the course the student should be able to: 2. To understand the basic concepts of Mathematical reasoning, set and functions. 3. To understand various counting techniques and principle of inclusion and exclusions. 4. Understand the concepts of various types of relations, partial ordering and 5. Equivalence relations. 6. Apply the concepts of generating functions to solve the recurrence relations. 7. Familiarize the fundamental concepts of graph theory and shortest path algorithm		
Unit No.		**Course Content**	**Hours**	
Unit I		**The Foundations:** Logic and proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.**Basic Structures:** Sets, Functions, Sequences, Sums, and Matrices: Sets, set operations, Functions, Sequences and Summations, matrices.	10	
Unit II		**Counting:** Basics of counting, Pigeonhole principle, Permutation and combination, Binomial Coefficient and Combination, Generating Permutation and Combination. **Advanced Counting Techniques:** Applications of Recurrence Relations, Solving Linear Recurrence, Relations, Divide and Conquer Algorithms and Recurrence Relations, Generating functions, Inclusion-Exclusion, Applications of Inclusion-exclusion.	10	
Unit III		**Induction and Recursion:** Mathematical Induction, Strong Induction and Well- Ordering, Recursive Definitions and Structural Induction, Recursive	12	

	Algorithms, Program Corrections. **Relation:** Properties of relation, Composition of relation, Closer operation on relation, Equivalence relation and partition. Operation on relation, Representing relation.	
Unit IV	**Graphs**: Graphs and Graph models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring..	08

Recommended Learning Resources

Print Resources	**Reference Books:** 1. Discrete Mathematics and Its Applications, Kenneth H. Rosen: Seventh Edition, 2012. 2. Discrete Mathematical Structure, Bernard Kolman, Robert C, Busby, Sharon Ross, 2003. 3. Graph Theory with Applications to Engg and Comp. Sci: Narsingh Deo-PHI1986. 4. Discrete and Combinatorial Mathematics Ralph P. Grimaldi, B. V. Ramatta, Pearson, Education, 5Edition. 5. Discrete Mathematical Structures, Trembley and Manobar.

Year	I	Course Code: 21BCA2O2MPL	Credits	03
Sem.		Course Title: Web Designing	Hours	40

Course Pre-requisites, if any	NA	
Formative Assessment Marks: 40	Summative Assessment Marks: 60	Duration of ESA:..02 hrs.
Course Outcomes	At the end of the course the student should be able to: 1. Understand the History of Internet and web Designing tools 2. Understand Markup Languages and stylesheet 3. Implement Scripting 4. Appreciate website creation	

Unit No.	Course Content	Hours
Unit I	Histroy of Internet, The World Wide Web, Web Browser, Web Server, URL, Working of Web, Web Page, Types of Web Pages, Web Content, Websites, Home Pages, Building Website, Website building tools; Web graphics design, basic tips for graphics design, to web programming: what is web programming? , web programming languages.	10
Unit II	Introduction to XHTML- Basic Syntax, Standard structure, Basic text markup, Images, Hypertext, Links, Lists, Tables, Forms-<form>,<input>,<label>,<select>,<textarea> tags and action buttons(submit and reset).CSS-Introduction, Levels of style sheets, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The box model, Background images, The <span> and <div>tags.	10
Unit III	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 regular expressions; Errorsin scripts; Examples.	10
Unit IV	Introduction to XML, Syntax of XML , XML document structure, Displaying raw XML documents, Displaying XML documents with CSS,XSLT Stylesheets and Displaying XML documents with XSLT.	10

	Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation	
	Recommended Leaning Resources	
Print Resources	**Reference Books:** 1. Robert W. Sebestra, "Programming the World Wide Web", 7th Edition /4th edition Addison Wesley Publication,2013. 2. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India 3. Web Technologies, Black Book, dreamtech Press 4. HTML 5, Black Book, dreamtech Press 5. Web Design, Joel Sklar, Cengage Learning 6. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill 7. Internet and World Wide Web How to program, P.J. Deitel& H.M. Deitel, Pearson	

Question Paper Pattern:

RANI CHANNAMMA UNIVERSITY
Department of Computer Science

Bachelor of Computer Applications

Sub:　　　　　　　**Code:**　　　　　　**Maximum Marks: 60**

　　　　a.　**Answer any Six Questions　from Question 1　b. Answer any**
　　　　Three each Questions　from Question 2,3,4 and 5

Q.No.1.	**Answer any Six Questions (Atlest Two question from Each Unit)** **a.** **b.** **c.** **d,** **e.** **f.** **g.** **h.**	**2X6=12**
Q.No.2.	**(Should cover Entire Unit-I)** **a.** **b.** **c.** **d.**	**4X3=12**
Q.No.3.	**(Should cover Entire Unit-II)** **a.** **b.** **c.** **d.**	**4X3=12**
Q.No.4.	**(Should cover Entire Unit-III)** **a.** **b.** **c.** **d.**	**4X3=12**
Q.No.5.	**(Should cover Entire Unit-IV)** **a.** **b.** **c.** **d.**	**4X3=12**

ASSESSMENT METHODS
Evaluation Scheme for Internal Assessment:

Theory:

Assessment Criteria	40 marks
1st Internal Assessment Test for30 marks 1 hr after 8 weeks and 2nd Internal Assessment Test for 30 marks 1 hr after 15 weeks . Average of two tests should be considered.	30
Assignment	10
Total	**40**

Assessment Criteria	25 marks
1st Internal Assessment Test for20 marks 1/2 hr after 8 weeks and 2nd Internal Assessment Test for 20 marks 1/2 hr after 15 weeks. Average of two tests should be considered.	20
Assignment	05
Total	**25**

Practical:

Assessment Criteria	25 marks
Semester End Internal Assessment Test for 20 marks 2 hrs	20
Journal (Practical Record)	05
Total	**25**