



**Tumkur University
Tumkur
Board of Studies in Computer Science**

National Education Policy-2020

Curriculum Structure and Syllabus for 1st and 2nd Semesters

Bachelor of Computer Applications (Basic and Honours Degree)

&

Open Elective and Skill Enhancement Courses in Computer Science

**Submitted to
Tumkur
University
Tumakuru**

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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. Parallely, 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 after successful 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 in design 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.

- l 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
- l To develop the ability to use this knowledge to analyse new situations in the application domain
- l 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.
- l The ability to synthesize the acquired knowledge, understanding and experience for a better and improved comprehension of the real-life problems
- l To learn skills and tools like mathematics, statistics and electronics to find the solution, interpret the results and make predictions for the future developments
- l To formulate, to model, to design solutions, procedure and to use software tools to solve real world problems and evaluate

The objectives of the Programme are:

1. The primary objective of this program is to provide a foundation of computing principles and business practices for effectively using/managing information systems and enterprise software
2. It helps students analyze the requirements for system development and exposes students to business software and information systems
3. This course provides students with options to specialize in legacy application software, system software or mobile applications
4. To produce outstanding IT professionals who can apply the theoretical knowledge into practice in the real world and develop standalone live projects themselves
5. To provide opportunity for the study of modern methods of information processing and its applications.
6. To develop among students the programming techniques and the problem- solving skills through programming
7. To prepare students who wish to go on to further studies in computer science and related subjects.
8. To acquaint students to Work effectively with a range of current, standard, Office Productivity software applications

Program Outcomes: **BCA (3 Years) Degree**

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 analyze 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 modeling, 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.

Additional Program Outcomes: **BCA Degree (Hons)**

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 project development
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 existing problems
4. The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.
5. The ability to work independently on a substantial software project and as an effective team member.

Model Curriculum for BCA

Sem	Core Courses	Hour / Week		DS Elective Courses	Hous/ Week
		Theory	Lab		
1	i. Fundamentals of Computers	3			
	ii. Programming in C	3			
	iii. Mathematical Foundation/ Accountancy	3			
	iv. LAB: Information Technology		4		
	v. LAB: C Programming		4		
2	i. Discrete Mathematical Structures	3			
	ii. Data Structures using C	3			
	iii. Object Oriented Concepts using JAVA	3			
	iv. LAB: Data Structure		4		
	v. LAB: JAVA Lab		4		
3	i. Data Base Management Systems	3			
	ii. C# and DOT NET Framework	3			
	iii. Computer Communication and Networks	3			
	iv. LAB: DBMS		4		
	v. LAB: C# and DOT NET Framework		4		
4	i. Python Programming	3			
	ii. Computer Multimedia and Animation	3			
	iii. Operating Systems Concepts	3			
	iv. LAB: Multimedia and Animation		4		
	v. LAB: Python programming		4		
5	i. Internet Technologies	3		(a) Cyber Law and Cyber Security	3
	ii. Statistical Computing and R Programming	3		(b) Cloud Computing	3
	iii. Software Engineering	3		(c) Business Intelligence	3
	iv. LAB: R Programming		4		
	v. LAB: JAVA Script, HTML and CSS		4		
	vi. Vocational 1	3			
6	i. Artificial Intelligence and Applications	3		(a) Fundamentals of Data Science	3
	ii. PHP and MySQL	3		(b) Mobile Application Development	3
	iii. LAB: PHP and MySQL		4	(c) Embedded Systems	3
	iv. PROJECT:		12		
	v. Vocational 2	3			
7	i. Analysis and Design of Algorithms	3		(a) Data Compression	3
	ii. Data Mining and Knowledge Management	3		(b) IoT	3
	iii. LAB: Algorithms		4	(c) Data Analytics	3
	iv. LAB: Data Mining and Knowledge Management		4		
	v. Vocational 3				
8	i. Automata Theory and Compiler Design	3		(a) Open-Source Programming	3
	ii. Cryptography and Network Security	3		(b) Storage Area Networks	3
	iii. Compiler Lab		4	(c) Pattern Recognition	3
	iv. LAB: Project		12	(a) Machine Learning	3
	v. Vocational 4	3			

Note: The students who have studied Mathematics at 10+2 has to study Accountancy and who have studied Accountancy at 10+2 has to study Mathematical Foundation in first semester BCA.

TABLE I: COURSE STRUCTURE FOR BCA.

Semester	Course Code	Title of the Paper	Credit	Total Credit of OE, Languages, CADSE, Voc, AECC, SEC	Total Credit
I	CADSCo1	Fundamentals of Computers	3	13	26
	CADSCo2	Programming in C	3		
	CADSCo3(a)/(b)	Mathematical Foundation/ Accountancy	3		
	CADSCo1P	LAB: Information Technology	2		
	CADSCo2P	LAB: C Programming	2		
II	CADSCo4	Data Structures using C	3	13	26
	CADSCo5	Object Oriented Concepts using JAVA	3		
	CADSCo6	Discrete Mathematical Structures	3		
	CADSCo4 P	LAB: Data Structure	2		
	CADSCo5 P	LAB: JAVA	2		
III	CADSCo7	Data Base Management Systems	3	13	26
	CADSCo8	C# and DOT NET Framework	3		
	CADSCo9	Computer Communication and Networks	3		
	CADSCo7P	LAB: DBMS	2		
	CADSCo8P	LAB: C# and DOT NET Framework	2		
IV	CADSC10	Python Programming	3	13	26
	CADSC11	Computer Multimedia and Animation	3		
	CADSC12	Operating System Concepts	3		
	CADSC10P	LAB: Python programming	2		
	CADSC11P	LAB: Multimedia and Animation	2		
V	CADSC13	Internet Technologies	3	10	23
	CADSC14	Statistical Computing and R Programming	3		
	CADSC15	Software Engineering	3		
	CADSC13P	LAB: JAVA Script, HTML and CSS	2		
	CADSC14P	LAB: R Programming	2		
VI	CADSC16	PHP and MySQL	3	10	23
	CADSC17	Artificial Intelligence and Applications	3		
	CADSC16P	LAB: PHP and MySQL	2		
	CA-P1	Project Work	5		
VII	CADSC18	Analysis and Design of Algorithms	3	11	21
	CADSC19	Data Mining and Knowledge Management	3		
	CADSC18P	LAB: Algorithms	2		
	CADSC19P	LAB: Data Mining	2		
	CAIo1	Internship	2		
VIII	CADSC20	Automata Theory and Compiler Design	3	6	20
	CADSC21	Cryptography and Network Security	3		
	CADSC20P	LAB: Compiler Lab	2		
	CAPo2	Project Work	6		

TABLE II: CS COURSE DETAILS FOR BCA

Course-Type	Course Code as referred above	Compulsory/ Elective	List of compulsory courses and list of option of elective courses. (A suggestive list)
CA	CADSCo1, CADSCo2, CADSCo3(a)/(b), CADSCo4, CADSCo5, CADSCo6, CADSCo7, CADSCo8, CADSCo9, CADSC10, CADSC11, CADSC12, CADSC13, CADSC14, CADSC15, CADSC16, CADSC17, CADSC18, CADSC19, CADSC20, CADSC21	Compulsory	As Mentioned in Table I
CA E	CADSE-1A	Elective	Cyber Law and Cyber Security OR Business Intelligence OR Fundamentals of Data Science
	CADSE-2A	Elective	Fundamentals of Data Science OR Mobile Application Development OR Embedded Systems
	CADSE-3A	Elective	Data Compression OR Internet of Things (IoT) OR Data Analytics
	CADSE-4A	Elective	Open-source Programming OR Storage Area Networks OR Pattern Recognition OR Machine Learning
Vocational	Vocational -1	Elective	DTP, CAD and Multimedia OR Hardware and Server Maintenance OR Web Content Management Systems OR Computer Networking OR Health Care Technologies OR Digital Marketing OR Office Automation
	Vocational -2	Elective	
	Vocational -3	Elective	
	Vocational -4	Elective	
SEC	SEC 1	Compulsory	Health & Wellness/ Social & Emotional Learning
	SEC 2	Compulsory	Sports/NCC/NSS etc
	SEC 3	Compulsory	Ethics & Self Awareness
	SEC 4	Compulsory	Professional Communication
AECC	AECC1	Compulsory	Environmental Studies
	AECC2	Compulsory	Constitution of India
Language 1	L1-1, L1-2, L1-3, L1-4	Compulsory	Kannada/Functional Kannada
Language 2	L2-1, L2-2, L2-3, L4-4	Elective	English/Hindi/French/ Additional English/ etc.

Model Course Content for BCA, Semesters I and II

Semester: I

Course Code: CADSCo1	Course Title: Fundamentals of Computers
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	

Course Outcomes (COs):

- Introduction to computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers
- Operating systems, functions of operating systems, classification of operating systems, kernel, shell, basics of Unix, shell programming, booting
- Databases, why databases are used, users, SQL, data types in SQL, introduction of queries - select, alter, update, delete, truncate, using where, and or in not in
- Internet basics, features, applications, services, internet service providers, domain name system, browsing, email, searching
- Web Programming basics, introduction of HTML and CSS programming
- Introduction of computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers. -

Course Content

Content	Hours
Unit - 1	
Fundamentals of Computers: Introduction to Computers - Computer Definition, Characteristics of Computers, Evolution and History of Computers, Types of Computers, Basic Organisation of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples.	10

Unit-2	
Introduction to computers: Characteristics of computers, Classification of Digital Computer Systems: Microcomputers, Minicomputers, Mainframes, Super computers. Anatomy of Computer: Introduction, Functions & Components of a Computer, Central Processing Unit, Microprocessor, Storage units, Input and output Devices. How CPU and memory works. Program execution with illustrative examples. Introduction to microcontrollers.	10
Unit-3	
Operating System Fundamentals: Operating Systems: Introduction, Functions of an operating System, Classification of Operating Systems, System programs, Application programs, Utilities, The Unix Operating System, Basic Unix commands, Microkernel Based Operating System, Booting.	10
Unit-4	
Introduction to Database Management Systems: Database, DBMS, Why Database -File system vs DBMS, Database applications, Database users, Introduction to SQL, Data types, Classification of SQL-DDL with constraints, DML, DCL, TCL	6
Unit-5	
Internet Basics: Introduction, Features of Internet, Internet application, Services of Internet, Logical and physical addresses, Internet Service Providers, Domain Name System.	6
Web Basics: Introduction to web, web browsers, http/https, URL, HTML5, CSS	

Text Books:

1. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication
2. David Riley and Kenny Hunt, Computational thinking for modern solver, Chapman & Hall/CRC,

Reference:

1. J. Glenn Brook shear, "Computer Science: An Overview", Addison-Wesley, Twelfth Edition,
2. R.G. Dromey, "How to solve it by Computer", PHI,

Course Code: CADSCo1P	Course Title: Information Technology Lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 52	

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.
4. LAN and WiFi Basics.
5. Operating System Installation – Windows OS, UNIX/LINUX, Dual Booting.
6. 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,
7. System Configuration – BIOS Settings, Registry Editor, MS Config, Task Manager, System Maintenance, Third-party System Maintenance Tools (Similar to CCleaner and Jv16 PowerTools ...)

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 flowarithmetic 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.

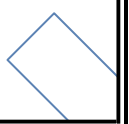
NOTE: In addition to the ones listed above, universities can include other activities so as for the student to become proficient in using personal computers for multiple purposes for which modern computers can be put to use.

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/>



Course Code: CADSCo2	Course Title: Programming in C
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Confidently operate Desktop Computers to carry out computational tasks
- Understand working of Hardware and Software and the importance of operating systems
- Understand programming languages, number systems, peripheral devices, networking, multimedia and internet concepts
- Read, understand and trace the execution of programs written in C language
- Write the C code for a given problem
- Perform input and output operations using programs in C
- Write programs that perform operations on arrays

Course Content

Content	Hours
Unit - 1	
<p>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.</p> <p>C Programming Basic Concepts: C Character Set; C tokens - keywords, identifiers, constants, and variables; Data types; Declaration & initialization of variables; Symbolic constants.</p> <p>Input and output with C: Formatted I/O functions - <i>printf</i> and <i>scanf</i>, control stings and escape sequences, output specifications with <i>printf</i> functions; Unformatted I/O functions to read and display single character and a string - <i>getchar</i>, <i>putchar</i>, <i>gets</i> and <i>puts</i> functions.</p>	10
Unit - 2	
<p>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.</p> <p>Control Structures: Decision making Statements - <i>Simple if</i>, <i>if_else</i>, <i>nested if_else</i>, <i>else_if ladder</i>, <i>Switch Case</i>, <i>goto</i>, <i>break</i> & <i>continue</i> statements; Looping</p>	12

Statements - Entry controlled and exit controlled statements, <i>while</i> , <i>do-while</i> , <i>for</i> loops, Nested loops.	
Unit - 3	
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 - <i>strlen</i> , <i>strcmp</i> , <i>strcpy</i> and <i>strcat</i> ; Character handling functions - <i>toascii</i> , <i>toupper</i> , <i>tolower</i> , <i>isalpha</i> , <i>isnumeric</i> etc.	8
Unit - 4	
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;	4
Unit - 5	
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.	8

Text Books:

1. C: The Complete Reference, By Herbert Schildt.
2. C Programming Language, By Brain W. Kernighan
3. Kernighan & Ritchie: The C Programming Language (PHI)

Reference Books:

1. P. K. Sinha & Priti Sinha: Computer Fundamentals (BPB)
2. E. Balaguruswamy: Programming in ANSI C (TMH)
3. Kamthane: Programming with ANSI and TURBO C (Pearson Education)
4. V. Rajaraman: Programming in C (PHI - EEE)
5. S. Byron Gottfried: Programming with C (TMH)
6. Yashwant Kanitkar: Let us C
7. P.B. Kottur: Programming in C (Sapna Book House)

Course Code: CADSCo2P	Course Title: C Programming Lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 52	

Programming Lab

Part A:

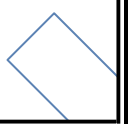
1. Program to read radius of a circle and to find area and circumference
2. Program to read three numbers and find the biggest of three
3. Program to demonstrate library functions in math.h
4. Program to check for prime
5. Program to generate n primes
6. Program to read a number, find the sum of the 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 else-if ladder)
9. Program to find the roots of quadratic equation (demonstration of switch Case statement)
10. Program to read marks scored by n students and find the average of marks
(Demonstration of single dimensional array)
11. Program to remove Duplicate Element in a single dimensional Array
12. Program to perform addition and subtraction of Matrices

Part B:

1. Program to find the length of a string without using built in function
2. Program to demonstrate string functions.
3. Program to demonstrate pointers in C
4. Program to check a number for prime by defining isprime() function
5. Program to read, display and to find the trace of a square matrix
6. Program to read, display and add two m x n matrices using functions
7. Program to read, display and multiply two m x n matrices using functions

8. Program to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters.
9. Program to Reverse a String using Pointer
10. Program to Swap Two Numbers using Pointers
11. Program to demonstrate student structure to read & display records of n students.
12. 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



Course Code: CADSCo3(a)	Course Title: Mathematical Foundation
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	

Course Outcomes (COs):

- Study and solve problems related to connectives, predicates and quantifiers under different situations.
- Develop basic knowledge of matrices and to solve equations using Cramer's rule.
- Know the concept of Eigen values.
- To develop the knowledge about derivatives and know various applications of differentiation.
- Understand the basic concepts of Mathematical reasoning, set and functions

Content	Hours
Unit - 1	
Basic concepts of set theory: Mathematical logic introduction-statements Connectives-negation, conjunction, disjunction- statement formulas and truth tables- conditional and bi Conditional statements- tautology contradiction-equivalence of formulas-duality law-Predicates and Quantifiers, Arguments.	10
Unit - 2	
Operations on sets: power set- Venn diagram Cartesian product-relations - functions- types of functions - composition of functions.	10
Unit - 3	
Matrix algebra: Introduction-Types of matrices-matrix operations- transpose of a matrix -determinant of matrix - inverse of a matrix- Cramer's rule	10
Unit - 4	
Matrix: finding rank of a matrix - normal form-echelon form cayley Hamilton theorem-Eigen values	6
Unit - 5	
Differential calculus: Functions and limits - Simple Differentiation of Algebraic Functions - Evaluation of First and Second Order Derivatives - Maxima and Minima	6

Text Books:

P. R. Vittal-Business Mathematics and Statistics, Margham Publications, Chennai,

Reference Books:

B. S. Vatsa-Discrete Mathematics -New Age International Limited Publishers, New Delhi

Course Code: CADSCo3(b)	Course Title: Accountancy
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	

Course Outcomes (COs):

- Study and understand Accounting, systems of Book, Branches of accounting advantage and limitations
- Know the concept of accounting, financial accounting process and Journalization
- Maintenance different account book and reconciliations
- Preparations of different bills, and trial balance.
- Understand the basic concepts of Mathematical reasoning, set and functions

Content	Hours
Unit - 1	
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	10
Unit - 2	
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 - 3	
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 - 4	
Account Procedure: Honor of the Bill, Dishonor of the Dill, Endorsement, Discounting, Renewal, Bill for collection, Retirement of the Bill, Accommodation	6

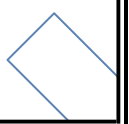
Bills, Bill Receivable Book and Payable Book.	
Preparation of Trial Balance: Rectification of errors and Journal Proper	
Unit - 5	
Preparation of Final Accounts: Meaning, need and classification, Preparation of Manufacturing, Trading, Profit and loss account and Balance – Sheet of sale- traders and partnership firms.	6

Text Books:

1. S. Ramesh, B.S. Chandrashekar, A Text Book of Accountancy.
2. V.A. Patil and J.S. Korihalli, Book – keeping and accounting, (R. Chand and Co. Delhi).
3. R. S. Singhal, Principles of Accountancy, (Nageen Prakash pvt. Lit. Meerut).
4. M. B. Kadhkol, Book – Keeping and Accountancy, (Renuka Prakashan, Hubil)
5. Vithal, Sharma:Accounting for Management, Macmillan Publishers, Mumbai.

Reference Books:

1. B.S. Raman, Accountancy, (United Publishers, Mangalore).
2. Tulsian, Accounting and Financial Management – I: Financial Accounting – Person Education.



Semester: II

Course Code: CADSCo4	Course Title: Data Structures using C
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms
- Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
- Demonstrate different methods for traversing trees
- Compare alternative implementations of data structures with respect to performance
- Describe the concept of recursion, give examples of its use
- Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing

Course Content

Content	Hours
Unit - 1	
<p>Introduction to data structures: Definition; Types of data structures - Primitive & Non-primitive, Linear and Non-linear; Operations on data structures.</p> <p>Dynamic memory allocation: Static & Dynamic memory allocation; Memory allocation and de-allocation functions - <i>malloc</i>, <i>calloc</i>, <i>realloc</i> and <i>free</i>.</p> <p>Algorithm Specification, Performance Analysis, Performance Measurement</p> <p>Recursion: Definition; Types of recursions; Recursion Technique Examples - GCD, Binomial coefficient nC_r, Towers of Hanoi; Comparison between iterative and recursive functions.</p>	8
Unit - 2	
<p>Arrays: Basic Concepts – Definition, Declaration, Initialisation, Operations on arrays; Types of arrays; Arrays as abstract data types (ADT); Representation of Linear Arrays in memory;</p> <p>Traversing linear arrays; Inserting and deleting elements; Sorting – Selection sort, Bubble sort, Quick sort, Selection sort, Insertion sort; Searching - Sequential Search,</p>	10

Binary search; Iterative and Recursive searching; Multidimensional arrays; Representation of multidimensional arrays; Sparse matrices.	
Unit - 3	
Linked list: Basic Concepts – Definition and Representation of linked list, Types of linked lists - Singly linked list, Doubly linked list, Header linked list, Circular linked list; Representation of Linked list in Memory; Operations on Singly linked lists – Traversing, Searching, Insertion, Deletion; Memory allocation; Garbage collection,	8
Unit - 4	
Stacks: Basic Concepts – Definition and Representation of stacks; Operations on stacks; 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;	8
Unit - 5	
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, inorder and postorder traversal;	8

Text Books

1. Ellis Horowitz and Sartaj Sahni: Fundamentals of Data Structures

References

1. Tanenbaum: Data structures using C (Pearson Education)
2. Kamathane: Introduction to Data structures (Pearson Education)
3. Y. Kanitkar: Data Structures Using C (BPB)
4. Kottur: Data Structure Using C
5. Padma Reddy: Data Structure Using C
6. Sudipa Mukherjee: Data Structures using C – 1000 Problems and Solutions (McGraw Hill Education, 2007))

Course Code: CADSCo4P	Course Title: Data Structures Lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 52	Formative Assessment Marks: 10
Exam Marks: 40	Exam Duration: 03 Hours

Programming Lab

Part A:

1. Program to find GCD using recursive function
2. Program to display Pascal Triangle using binomial function
3. Program to generate n Fibonacci numbers using recursive function.
4. Program to implement Towers of Hanoi.
5. Program to implement dynamic array, find smallest and largest element of the array.
6. Program to create two files to store even and odd numbers.
7. Program to create a file to store student records.
8. Program to read the names of cities and arrange them alphabetically.
9. Program to sort the given list using selection sort technique.
10. Program to sort the given list using bubble sort technique.

Part B:

1. Program to sort the given list using insertion sort technique.
2. Program to sort the given list using quick sort technique.
3. Program to sort the given list using merge sort technique.
4. Program to search an element using linear search technique.
5. Program to search an element using recursive binary search technique.
6. Program to implement Stack.
7. Program to convert an infix expression to postfix.
8. Program to implement simple queue.
9. Program to implement linear linked list.
10. Program to display traversal of a tree.

Course Code: CADSCo5	Course Title: Object Oriented Programming with JAVA
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- [Understand the features of Java and the architecture of JVM
- [Write, compile, and execute Java programs that may include basic data types and control flow constructs and how type casting is done
- [Identify classes, objects, members of a class and relationships among them needed for a specific problem and demonstrate the concepts of polymorphism and inheritance
- [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
- [Write, compile, execute Java programs that include GUIs and event driven programming and also programs based on files

Course Content

Content	Hours
Unit - 1	
Introduction to Java: Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.	6
Unit - 2	
Objects and Classes: Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.	6
Unit - 3	
Inheritance and Polymorphism: Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.	8
Unit - 4	
Event and GUI programming: Event handling in java, Event types, Mouse and	10

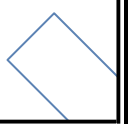
key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing, Exceptional handling mechanism.	
Unit - 5	
I/O programming: Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files.	6
Unit - 6	
Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.	6

Text Books

1. Programming with Java, By E Balagurusamy – A Primer, Fourth Edition, Tata McGraw Hill Education Private Limited.
2. Core Java Volume I – Fundamentals, By Cay S. Horstmann, Prentice Hall
3. Object Oriented Programming with Java : Somashekara, M.T., Guru, D.S., Manjunatha, K.S

Reference Books:

1. Java 2 - The Complete Reference – McGraw Hill publication.
2. Java - The Complete Reference, 7th Edition, By Herbert Schildt– McGraw Hill publication.



Course Code: CADSCo5P	Course Title: JAVA Lab
Course Credits: 02	Hours/Week: 04
Total Contact Hours: 52	

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- Implement Object Oriented programming concept using basic syntaxes of control Structures
- Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
- Demonstrates how to achieve reusability using inheritance
- Demonstrate understanding and use of interfaces, packages, different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
- Identify and describe common user interface components to design GUI in Java using Applet & AWT along with response to events

Practice Lab

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.


Programming Lab

PART A: Java Fundamentals OOPs in Java

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

4. 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.
5. 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.
6. Program
 - a. To find the area and circumference of the circle by accepting the radius from the user.
 - b. To accept a number and find whether the number is Prime or not
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 pass 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. In a college first year class are having the following attributes Name of the class (BCA, BCom, BSc), Name of the staff No of the students in the class, Array of students in the class
9. Define a class called first year with above attributes and define a suitable constructor. Also write a method called best Student () which process a first-year object and return the student with the highest total mark. In the main method define a first-year object and find the best student of this class
10. Program to define a class called employee with the name and date of appointment. Create ten employee objects as an array and sort them as per their date of appointment. ie, print them as per their seniority.
11. Create a package 'student. Fulltime. BCA 'in your current working directory
 - a. Create a default class student in the above package with the following attributes: Name, age, sex.
 - b. Have methods for storing as well as displaying

PART B: Exception Handling & GUI Programming

1. Program to catch Negative Array Size Exception. This exception is caused when the array is initialized to negative values.
 2. Program to handle Null Pointer Exception and use the "finally" method to display a message to the user.
 3. Program which create and displays a message on the window
 4. Program to draw several shapes in the created window
- 

5. Program to create an applet and draw grid lines
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 similar details of mother also appear.
7. Create a frame which displays your personal details with respect to a button click
8. Create a simple applet which reveals the personal information of yours.
9. Program to move different shapes according to the arrow key pressed.
10. Program to create a window when we press M or m the window displays Good Morning, A or a the window displays Good After Noon E or e the window displays Good Evening, N or n the window displays Good Night
11. Demonstrate the various mouse handling events using suitable example.
12. Program to create menu bar and pull-down menus.

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

Course Code: CADSCo6	Course Title: Discrete Mathematical Structures
Course Credits: 03	Hours/Week: 03
Total Contact Hours: 42	

Course Outcomes (COs):

After completing this course satisfactorily, a student will be able to:

- To understand the basic concepts of Mathematical reasoning, set and functions.
- To understand various counting techniques and principle of inclusion and exclusions.
- Understand the concepts of various types of relations, partial ordering and equivalence relations.
- Apply the concepts of generating functions to solve the recurrence relations.
- Familiarize the fundamental concepts of graph theory and shortest path algorithm

Course Content

Content	Hours
Unit - 1	
<p>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.</p> <p>Basic Structures: Sets, Functions, Sequences, Sums, and Matrices: Sets, set operations, Functions, Sequences and Summations, matrices.</p>	12
Unit - 2	
<p>Counting: Basics of counting, Pigeonhole principle, Permutation and combination, Binomial Coefficient and Combination, Generating Permutation and Combination.</p> <p>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.</p>	10
Unit - 3	
<p>Induction and Recursion: Mathematical Induction, Strong Induction and Well-</p>	12

Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Corrections. Relation: Properties of relation, Composition of relation, Closer operation on relation, Equivalence relation and partition. Operation on relation, Representing relation.	
Unit - 4	
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.	8

Text Book:

1. Discrete Mathematics and Its Applications, Kenneth H. Rosen: Seventh Edition, 2012.

References:

2. Discrete Mathematical Structure, Bernard Kolman, Robert C, Busby, Sharon Ross, 2003.
3. Graph Theory with Applications to Engg and Comp. Sci: Narsingh Deo-PHI 1986.
4. Discrete and Combinatorial Mathematics Ralph P. Grimaldi, B. V. Ramatta, Pearson, Education, 5 Edition.
5. Discrete Mathematical Structures, Trembley and Manobar.

Computer Application Core Courses (CA C) for BCA (Hons)

Sl. No	Course Code	Title of the Paper
1	CADSCo1	Fundamentals of Computers
2	CADSCo2	Programming in C
3	CADSCo3 (a)/(b)	Mathematical Foundation/ Accountancy
4	CADSCo4	Discrete Mathematical Structures
5	CADSCo5	Object Oriented Concepts using JAVA
6	CADSCo6	Data Structures using C
7	CADSCo7	Data Base Management Systems
8	CADSCo8	C# and DOT NET Framework
9	CADSCo9	Computer Communication and Networks
10	CADSC10	Python Programming
11	CADSC11	Computer Multimedia and Animation
12	CADSC12	Operating System Concepts
13	CADSC13	Internet Technologies
14	CADSC14	Statistical Computing and R Programming
15	CADSC15	Software Engineering
16	CADSC16	PHP and MySQL
17	CADSC17	Artificial Intelligence and Applications
18	CADSC18	Analysis and Design of Algorithms
19	CADSC19	Data Mining and Knowledge Management
20	CADSC20	Automata Theory and Compiler Design
21	CADSC21	Cryptography and Network Security



Computer Application Electives (CADSE) for BCA (Hons)

Sl. No	Computer Application Electives (CADSE)
1	Business Intelligence
2	Cyber Law and Cyber Security
3	Data Analytics
4	Data Compression
5	Embedded Systems
6	Fundamentals of Data Science
7	Internet of Things (IoT)
8	Machine Learning
9	Mobile Application Development
10	Open-source Programming
11	Pattern Recognition
12	Storage Area Networks

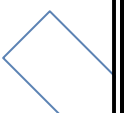
Vocational Electives

Sl. No	Vocational Electives
1	DTP, CAD and Multimedia
2	Hardware and Server Maintenance
3	Web Content Management Systems
4	Computer Networking
5	Health Care Technologies
6	Digital Marketing
7	Office Automation

Open Electives in Computer Science:

(For Students studying Core Courses other than Computer Science/ Computer Applications)

Sl. No	Open Electives in Computer Science
1	C Programming Concepts
2	Office Automation
3	Multimedia Processing
4	Python Programming Concepts
5	R Programming
6	E-Content Development
7	E-Commerce
8	Web Designing
9	Computer Animation
10	Accounting Package



Open Electives in Computer Science:

(For BA, BSc, BCom, BSW, BBA, BBM students studying Core Courses other than Computer Science/Computer Applications)

- Office Automation
- C Programming Concepts
- Multimedia Processing
- Python Programming Concepts
- R Programming
- E-Content Development
- E-Commerce
- Web Designing
- Computer Animation
- Accounting Package

Selected List of Open Electives in Computer Science:

Sem	Subjects	Hr/week
I	CSOEC01: Tally and GST	3
I	CSOEC02: Office Automation	3
II	CSOEC03: C - Programming Concepts	3
II	CSOEC04: Web Designing	3

OPEN ELECTIVE IN COMPUTER SCIENCE

TALLY AND GST

I SEMESTER

Course Code: CAOEC01	Course Title: TALLY AND GST
Course Credits: 03	Hour of Teaching/Week: 03
Total Contact Hours: 42	

3 Hrs/week

Total : 42 Hours

UNIT 1: Basics of Accounting and Tally

10 Hrs

Type of Accounts, Golden Rules of Accounting, Accounting Principles, Concepts and Conventions, Double Entry System of Book Keeping mode of accounting, Financial Statements, Transactions, Recording Transaction. Introduction to Tally, Versions of Tally. Accounting Groups-Primary groups are Capital Account, Current Assets, Current Liabilities, Fixed Assets, Investments, Loans (Liability), Suspense Account, Misc. Expenses, Sales Account, Purchase Account, Direct Income, Indirect Income, Direct Expenses, Indirect Expenses, Branch/Divisions. Secondary Groups are , Reserves & Surplus, Bank Account, Cash-in-hand, Deposits (Asset), Loans and Advances, Stock-in- hand, Sundry Debtors, Duties and Taxes, Provisions, Sundry Creditors, Bank OD Account, Secured Loans, Unsecured Loans.

UNIT 2: Company Info Menu

10 Hrs

Select Company, Shut Company, Create Company, Alter Company, Security control, Backup, Restore. Accounting Information- Accounting Configuration & Features, Group Creation, Multiple Group Creation, Ledger Creation, Multiple Ledger Creation, Advance Ledger Creation. Inventory Information-Inventory configuration &features, Inventory info. Menu, Stock groupsStock categories, Stock item, Unit of measurement, Bills of materials, Locations / Godowns

UNIT 3: Voucher Entry and Invoicing

09 Hrs

Introduction Voucher Type, Creating a Voucher Type, Displaying a Voucher Type, Altering a Voucher Type Accounting Vouchers, Receipt Voucher, Payment Voucher,

Contra Voucher, Journal Voucher, Purchase Invoice, Purchase Voucher, Sales Invoice, Sales Voucher, Debit Note, Credit Note Inventory Vouchers, Purchase Order, Sales Order, Delivery Note Voucher, Physical Stock Voucher.

UNIT 4: Taxation

05 Hrs

What is GST,CGST SGST,GST on Purchase invoice, GST on Sales invoice, IGST on Sales, other States, GST on Expenses, GST on Fixed Assets, GST on Buying or Servicing, Debit Note : Purchase Returns, Credit Note : Sales Returns, Day Book Report print

UNIT 5: Payroll Systems

08 Hrs

Industries or organization Payroll Management, Employee Groups Creations, Department wise Groups, Employees Creations with Name or Designations, Account Department, Admin Department, Purchase Department, Sales Department, Worker Department, Employees payment Units Types, Attendance / Production Types, Attendance leave with pay, leave without pay, Production Hrs.Pay Heads creations, Basic salary, HRA, DA, TA, PF,Employee allowances or Deductions, Maintain employees salary Details or Rate, Creating payroll vouchers, employee attendance sheet, present or leave, overtime manage, print all employee Salary, print Salary Slip.

Reference Books:

1. Tally Technology-"The Complete Reference"
2. Official guide to financial accounting using Tally ERP 9 with GST, Tally Education P.Ltd.

OPEN ELECTIVE IN COMPUTER SCIENCE

OFFICE AUTOMATION

SEMESTER

I

Course Code: CSOECO2	Course Title: OFFICE AUTOMATION
Course Credits: 03	Hour of Teaching/Week: 03
Total Contact Hours: 42	

3 Hrs / Week

Total Hrs:42

UNIT 1: Introduction to Computer and Windows

08 Hrs

Introduction, History of computer, Block diagram of a computer, Generation of computer, Classification of computers, Characteristics of computer, Applications of computer.

Windows concepts, general features of windows, different parts of windows screen, Setting the date and time, Icon explanation, paint, notepad, calculator, control panel, mouse properties, multitasking, my computer, folder creation, use of recycle bin and task bar.

UNIT 2: Word Processing - MS-Word

08 Hrs

Introduction to MS Word, parts of MS- word, Parts of MS-Word screen, Backstage view, editing the text, formatting the text, Text effects, Bullets add numbering, Paragraph formatting, Borders & Shadings, Text styles, Table formatting, Picture, clipart and shapes adding, SmartArt representing, Screenshot explanation, Header & Footer, Word art, Drop cap, Page setup, Watermark, Mail merge, Auto correct, Word count, Spell check & grammar check, Commenting, Restrict editing, Document views, Zoom options, Arranging & Splitting word screen, Printing document, Exit from MS Word.

UNIT 3: Spread Sheet**12 Hrs**

Introduction to MS-excel screen, Parts of MS-excel screen, Worksheet basic, creating worksheet, entering text, Dates, alphanumeric and values, conditional formatting, table formatting, Cell styles, Auto sum, Sorting & Filtering, Editing the table, explaining / types of charts, Page setup, print area, Sheet options, statistical, mathematical formulae, insert functions, protecting sheet & workbook, workbook views, exiting excel.

UNIT 4: Presentation Graphics - MS-Power Point**06 Hrs**

Introduction to MS-Power point screen, Parts of MS-Power point screen, New slide & Layout options, editing text, Images & Illustrations, Photo album, Page setup, Slide Themes, Background styles & Graphics, Slide Transition effects, Sound effects for text and images, new animation effects, Order & Reordering animation.

UNIT 5: Internet and ICT Tools**08 Hrs**

Definition, Internet, Intranet, Search engine, video conference, web browsers, online forms, drive, spread sheet, presentation slides, docs and classroom platform, Visualization tools.

Reference Books:

1. Microsoft Office 2020 -: Belton, Claire, John Walkenbach, Herb Tyson, Michael R Groh, Faithe Wempfen.
2. Microsoft Office 2010 for windows : Joe Habraken.

COMPUTER SCIENCE OPEN

ELECTIVE

C-PROGRAMMING CONCEPTS

II SEMESTER

Course Code: CSOEC03	Course Title: C-Programming concepts
Course Credits: 03	Hour of Teaching/Week: 03
Total Contact Hours: 42	

UNIT I : Introduction to Programming: 9 Hrs

Importance of C: Basic Structure of C Programs, Programming Style, Executing a C Program. Character Set ,C Tokens, Keywords and Identifiers ,Constants, Variables, Data Types ,Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants.

Managing Input and Output Operations: Reading a Character, Writing a Character, Formatted Input, Formatted Output.

Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity.

UNIT II : Decision Making and Branching: 9 Hrs

Introduction, Decision Making with IF Statement, Simple IF Statement, the IF ELSE Statement, Nesting of IF..... ELSE Statements, The ELSE IF Ladder, The Switch statement. Simple programs from program list.

Decision Making and Looping: The WHILE Statement, The DO-WHILE Statement, the FOR Statement, Jumps in LOOPS. Simple Programs from program list.

UNIT III : Arrays: 9 Hrs

One-dimensional Arrays, Declaration of One-dimensional Arrays, Initialization of One-dimensional Arrays, Example programs- Linear search, Binary search, Bubble sort. Two-

dimensional Arrays, Declaration of Two-dimensional Arrays, Initialization of Two dimensional Arrays. Simple Programs from program list.

UNIT IV : Character Arrays and Strings:

7 Hrs

Declaring and Initializing String Variables ,Reading Strings from Terminal ,Writing Strings to Screen , String-handling Functions (strlen(), strcpy(), strcmp(), strcat(), strrev()), Example Programs (with and without using built-in string functions). Simple Programs from program list

UNIT V : User-defined Functions:

8 Hrs

Elements of User-defined Functions, Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions, No Arguments and no Return Values, Arguments but no Return values, Arguments with Return Values, No Arguments but Returns a Value. Recursion - Factorial of an integer, Fibonacci series. Simple Programs from program list.

TEXT BOOKS:

1. E. Balagurusamy Programming in ANSI C, 5th Edition, Tata McGraw-Hill Publications
2. P B Kottur Computer Concepts and C Programming

REFERENCE BOOKS:

1. Kerningham Dennis Ritchie The C programming language (ANSI C version), 2 nd Edition, PHI India
2. Jeri R Hanly Elliot B Koffman Problem solving and program design in C Person Addison Wesley 2006
3. Yashwant Kanetkar Let us C, 6th Edition , BPB publication

C- Programs list for Practice

Programs List:

1. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:
Grade A: Percentage ≥ 80
Grade B: Percentage ≥ 70 and ≤ 60
Grade C: Percentage ≥ 60 and ≤ 40 and

Grade D: Percentage ≥ 40 and < 40

Grade E: Percentage < 40

2. Develop a C Program to implement a simple calculator to perform addition, subtraction, multiplication and division operations using switch construct. Display appropriate messages for invalid operator.
3. Develop a C Program to generate the Prime numbers between the ranges m & n using nested for loop construct.
4. Develop a C Program to find the GCD & LCM of two integers using Euclid's algorithm.
5. Develop a C program to read n elements into an integer array and sort the array using Bubble sort technique. Print the input array and the resultant array with suitable messages.
6. Develop a C Program to conduct Binary search for a key element over an array of n integer elements. Report success or failure with appropriate messages.
7. Develop a C program to print addition of two matrices.
8. Develop a C program to print product of two matrices.
9. Develop a C program to count the vowels & consonants in a given string.
10. Develop a recursive C function to find the factorial of a number.

COMPUTER SCIENCE OPEN

ELECTIVE

WEB DESIGNING

II SEMESTER

Course Code: CSOECO4	Course Title: Web Designing
Course Credits: 03	Hour of Teaching/Week: 03
Total Contact Hours: 42	

UNIT 1 : Fundamentals of web

06 Hrs

Internet, Intranet, WWW, web browsers, web servers, Search engines, DNS, URLs, MIME, HTTP, CGI, Internet Security.

UNIT 2 : Introduction to HTML

07 Hrs

Introduction, History and versions of HTML, Advantages & Disadvantages of HTML, Hypertext and Hypertext Markup Language, Why HTML, Prerequisites. Basic structure of HTML, HTML comments.

UNIT 3 : Tags and Elements of HTML documents:

09 Hrs

Definition of tag, HTML Element, different types of tags: container tag and empty tag, Basic text markup: title tag, head tag, body tag, Paragraphs <p>, Headings <h1>.....<h6>, preserving white space <pre>tag, Line break
, <hr>, Presentation elements: <i>, , <u>, <sup>, <sub>, <s>, <tt>, <big>, <small>, Phrase elements: , , <meta> tag, Character entities.

UNIT 4 : Lists , Images and Hyper Linking in HTML:

08 Hrs

Lists: Ordered lists, Unordered lists and Definition lists, adding images using tags and setting an image as background, embedding a multimedia on to a web page: Inserting audio files and video <marquee> behaviour, types of Hyperlinks: Internal Links, Local links, External Links, anchor <a> tag, links with text and images.

UNIT 5 : Tables, Forms and Frames in HTML:

12 Hrs

Creating and managing tables: Defining border, <tr>, <th> and <td> tags, cellspacing and cell padding attributes, rowspan and colspan attributes, <Caption> tag and its attributes, Managing Forms: creating interactive forms, Different types of Form Controls: Text Input Controls, Checkboxes Controls, Radio Box Controls, Select Box Controls, File Select boxes, Hidden Controls, Clickable Buttons, Menus and buttons, action controls: submit and reset, Using Frames: <frameset> and <frame>, nested frames

Reference Books:

1. Robert W. Sebesta: Programming the World Wide Web, 4th Edition, Pearson Education, 2008
2. Thomas A. Powell, HTML & CSS: The Complete Reference, Fifth Edition

SKILL ENHANCEMENT COURSE
CSSEC01: Basics of Computers 1st

Semester

2Hrs/week

Total: 28 hrs

Unit 1: COMPUTER BASICS

5 hrs

Evolution of computers, characteristics of computer, computer generations: first generation, second generation, third generation, fourth generation and fifth generation computers. Classification of computers: based on working principle, size and capability, computer applications: data processing, commercial, office automation, industry and engineering, healthcare, education, graphics and multimedia applications.

Unit 2: COMPUTER ORGNIZATION

5hrs

Block diagram of computer, computer memory: primary memory: Read Only Memory and Random Access Memory. Secondary memories- hard disk, floppy disk, compact disk, blue ray disk, pen drive, memory cord. Input devices: key board, mouse, OMR, OCR, MICR, BCR and scanner. Output devices: monitor (CRT ,LCD, LED), printers: impact and non impact printers, plotters.

Unit 3: NUMBER SYSTEM

3 hrs

Introduction to number systems, positional and non positional number systems. Decimal, binary, octal and hexa decimal number systems and their conversation.

Unit 4: COMPUTER HARDWARE AND SOFTWARE

5 hrs

Computer hardware, computer software-types of software: system software, application software, programming languages, low level and high level languages. Program translators: assemblers, compilers, interpreters. Problem solving techniques: steps in problem solving techniques, algorithm: characteristics, examples, flowchart: flowchart symbols, examples.

Unit 5: COMPUTER NETWORKS AND INTERNET APPLICATIONS **3 hrs**

Introduction, Types of Networks, Network Topology. LAN, WAN, MAN, Intranet and Internet, Internet applications, WWW, E-mail, browsing and searching. Search engines. Computer virus antivirus and surfing.

Unit 6: OPERATING SYSTEM **2 hrs**

Introduction to OS, functions of OS, different views of OS, type of OS, DOS : internal and external commands.

Unit 7: MS-OFFICE **5hrs**

MS Word: Introduction to MS-Word, Editing a document, Formatting a document, Preview document, Printing a document, Find and Replace, Checking the grammar and Spelling , Word count, Header and footer, Auto correct and auto text, Drawing and insert objects, Table generation. MS Excel: Worksheet basic, Creating worksheet, Entering text, Dates, alphanumeric and values, Tool bars and menus, Applying different formulas, Creating charts, Formatting of work sheet. MS Power Point: Need of power point, Creating slides, Entering text, graphics, pictures and other objects, Tool bars and menus, Custom animation, Creating charts, Formatting of presentation.

Reference Books:

1. Introduction to computer concepts: Pearson publication.
2. Computer Fundamentals : Anita Goel, Pearson publication.
3. Fundamentals of Computers, - V. Rajaraman.: PHI (EEE)
4. Microsoft office 2010: John Walkenbach, Herb Tyson, Michael R Groh, FaitheWempen. 6. Microsoft office 2010 for windows : Steve Schwartz.

CSSECo2: Hardware Maintenance

Course Code: CSSECo2	Course Title: Hardware Maintenance
Course Credits: 02	Hour of Teaching/Week: 02
Total Contact Hours: 28	Formative Assessment Marks:
Exam Marks:	Exam Duration:

UNIT I

1. Basics of Computer and Hardware : 5Hrs

Introduction and Functional block diagram of pc with its internal Working, Introduction to computer parts: SMPS, Motherboard, Processor, Ram, Hard disk, Optical drive, Cabinet, Keyboard, Mouse, Monitor, Add-On Cards.

UNIT II

1. Assembling and Setting BIOS of computer 5Hrs

Assembling of Personal Computer components, Cable Connection and power Connections. CMOS Setup, formatting of Hard Disk, Disk Management Procedure, Bios Password Setting and Recovery in PC and Laptops. Perform repairs to personal computers

UNIT III

1. Installation of Operating System and Application Software 8Hrs

Operating System Installations and Booting Procedures of Windows, Linux, Ubuntu and Drivers, office automation software, compression software, media players, Page Maker, Corel Draw, Kannada Nudi software and Typing.

UNIT IV

1. Installation of Peripherals devices and Antivirus 8Hrs

Installation of peripheral Parts of computer like Printer, Scanner, Web Camera. Installation of Antivirus software and Activation like NPAV, Updating, Scanning. Configure Internet and Email

Reference Book

1. R. K. Sharma- Computer Hardware, Himalaya Publishing House, Mumbai.

CSSEC03: Networking

Course Code: SEC(SEC2.1)	Course Title: Networking
Course Credits: 02	Hour of Teaching/Week: 02
Total Contact Hours: 26	Formative Assessment Marks:
Exam Marks:	Exam Duration: 03

UNIT I

Basics of Computer Networks

5Hrs

Introduction and classification of Network, Functional block diagram of Network. Introduction and Identification of Network Parts: Cable, Switch, Router, Connector, Network Tools, Wall Rack, Modem, Wi-Fi Dongle, Add-On Cards.

UNIT II

Installation of computer Network

10Hrs

Building your own Network with all parts, Network Topology, Cable Crimping, Connections, IP Address Setting, Domain Creation, LAN Creation, Connecting to Internet, Testing of connectivity, Sharing Device and Data, Remote Access, Uses of sharing Software with internet, Remote installation

UNIT III

Information of CCTV Network

8Hrs

Introduction and classification of CCTV Network, Functional block diagram of CCTV Network Identification of CCTV Network Parts, Types of Cable, DVR, NVR, Mouse, Monitor, HDD, Power and Video Connectors and other. Installation CCTV Setup, Installation of Online and offline setup, Security of CCTV Network.

UNIT IV

Troubleshooting

Fault Finding and Troubleshooting of Network and CCTV Network

3Hrs

Reference Book

1. R. K. Sharma- Computer Hardware, Himalaya Publishing House, Mumbai.

CSSEC03: DIGITAL MARKETING

Course Code: CSSEC04	Course Title: DIGITAL MARKETING
Course Credits: 02	Hour of Teaching/Week: 02
Total Contact Hours: 28	

DIGITAL MARKETING INTRODUCTION

8 Hrs

What is marketing, What is Digital Marketing, Understanding Marketing Process Understanding Digital Marketing Process, Increasing Visibility, What is visibility, Types of visibility, Examples of visibility, Visitors Engagement, What is engagement?, Why it is important Examples of engagement, Bringing Targeted Traffic, Inbound and outbound marketing, Converting Traffic into Leads, Types of Conversion , Understanding Conversion Process, Tools Needed.

DIGITAL MARKETING VS. TRADITIONAL MARKETING

6 Hrs

What's the difference between digital marketing and traditional marketing, and why does it matter? Benefits of Traditional Marketing, The Downside to Traditional Marketing Benefits of Digital Marketing Why Digital Marketing Wins Over Traditional Marketing? Tools of Digital Marketing How We Use Both Digital & Traditional Marketing.

WEBSITE PLANNING PROCESS

6 Hrs

What is Internet?, Understanding domain names & domain extensions, Different types of websites Based on functionality, Based on purpose Planning & Conceptualising a Website, Booking a domain name & web hosting, Adding domain name to web Server, Adding webpages & content, Adding Plugins, Building website using CMS in Class, Identifying objective of website, Deciding on number of pages required, Planning for engagement options Landing Pages & Optimization, Creating blueprint of every webpage, Best & Worst Examples.

SOCIAL MEDIA MARKETING

8 Hrs

What is social media? (Face book, LinkedIn and Google) Understanding the existing Social Media paradigms & psychology, how social media marketing is different than, others Forms of Internet marketing, Social Media marketing & Understanding Social Media marketing, Creating Social Media page Uploading contacts for invitation Exercise on fan page wall posting Increasing fans on fan page How to do marketing on fan page (with examples). Fan engagement Important apps to do fan page marketing Social Media advertising, Types of Social Media advertising, best practices for Social Media advertising, Digital Marketing Tool Demo.