



Shri Sangameshwar Education Society's  
**Sangameshwar College, Solapur [Autonomous]**  
 (Affiliated to Punyshlok Ahilyadevi Holkar Solapur University,  
 Solapur) Kannada Linguistic Minority Institute  
**NAAC Accredited with 'A' Grade (III Cycle CGPA 3.39)**

**Table-1**  
**Structure of Choice Based Credit System for Undergraduate Science Programme B.Sc ECS.**  
**To be implemented from A.Y. 2020-2021**

Semester	Course		Teaching Scheme/week		
			Hours	Lectures	Credits
I	AECC-A	English Communication-I	3.2	4	2
	DSC-1A	Fundamentals of Computer	4	5	4
		Office Automation			
		Practical-I			
	DSC-2A	Logic Development With 'C' Programming	4	5	4
		Advanced Programming in C			
		Practical-I			
	DSC-3A	Discrete Structure	4	5	4
		Numerical Methods			
		Practical-I			
	DSC-4A	Linear Electronics-I	4	5	4
		Digital Electronics			
		Practical-I			
			Total	32	40
II	AECC-B	English Communication-II	3.2	4	2
	DSC-1B	Web Technology -I	4	5	4
		Web Technology -II			
		Practical-I			
	DSC-2B	Object Oriented Programming-I	4	5	4
		Object Oriented Programming-II			
		Practical-I			
	DSC-3B	Mathematical Algebra	4	5	4
		Operation Research			
		Practical-I			
	DSC-4B	Linear Electronics-II	4	5	4
		Digital Electronics and Microprocessor			
		Practical-I			
			Democracy, Elections and Good Governance	2.4	3
		Total	32+2.4	40+3	26
		Total Semester I and II			52

**Table-2****Structure of Examination Mark Scheme of C.B.C.S. for Undergraduate Science Programme B.Sc ECS.**

Semester	Course		EXAMINATION			Credits
			Marks			
			CA	SE	Total	
I	AECC-A	English Communication-I	15	35	50	2
	DSC-1A	Fundamentals of Computer	15	35	50	2
		Office Automation	15	35	50	2
	DSC-2A	Logic Development With 'C' Programming	15	35	50	2
		Advanced Programming in C	15	35	50	2
	DSC-3A	Discrete Structure	15	35	50	2
		Numerical Methods	15	35	50	2
	DSC-4A	Linear Electronics-I	15	35	50	2
		Digital Electronics	15	35	50	2
	<b>Total</b>			<b>135</b>	<b>315</b>	<b>450</b>
II	AECC-B	English Communication-II	15	35	50	2
	DSC-1B	Web Technology -I	15	35	50	2
		Web Technology -II	15	35	50	2
	DSC-2B	Object Oriented Programming-I	15	35	50	2
		Object Oriented Programming-II	15	35	50	2
	DSC-3B	Mathematical Algebra	15	35	50	2
		Operation Research	15	35	50	2
	DSC-4B	Linear Electronics-II	15	35	50	2
		Digital Electronics and Microprocessor	15	35	50	2
	DSC-1A & DSC-1B	Practical-I	30	70	100	4
	DSC-2A & DSC-2B	Practical-I	30	70	100	4
	DSC-3A & DSC-3B	Practical-I	30	70	100	4
	DSC-4A & DSC-4B	Practical-I	30	70	100	4
	Democracy, Elections and Good Governance		15	35	50	--
	<b>Total</b>		<b>255+15</b>	<b>595+35</b>	<b>850+50</b>	<b>34</b>
<b>Total Semester I and II</b>			<b>390+15</b>	<b>910+40</b>	<b>1300+50</b>	<b>52</b>

<b>DSC-1A Theory-I Title: Fundamentals of Computer</b>		<b>Hours 30</b>
Unit 1	<b>Introduction to Computer</b> Introduction to Computer ,Characteristics of computer, Evolution of computer and Generations ,Classification and types of computers,Block diagram of computer, Basic Units of computer- Input unit CPU- ALU Memory unit and control unit output unit	7
Unit 2	<b>Computer Memory, I/O devices</b> Memory concepts,Types of Memory-Primary memory-RAM,ROM, EPROM, EEPROM Secondary Memory-Magnetic Tape Magnetic Disk (Floppy disk and Hard Disk), Compact Disk. Input Devices- Keyboard Mouse Light pen Output Devices - Printers- Dot Matrix ,Daisywheel, Ink Jet Laser, Line (Chain and Drum) ,Plotters.	8
Unit 3	<b>Operating System Concept:</b> Introduction to Operating system, services and features of OS, Types of Operating System, Components of OS, Introduction to PC Operating Systems: - DOS and Windows ,Concept and working with files and folders, Introduction to Mobile Operating System: - Android, Windows, IOS.	8
Unit 4	<b>Computer Communication and Networks:</b> Concepts of computer communication, Computer network - LAN, WAN,MAN ,etc, Network Topologies, Communication Channels Protocols, Introduction to Internet, Browsers, Overview of modem, Bluetooth and router device, Buying & selling products over the internet, Introduction of E-Mail, Introduction to Search Engines.	7
<p><b>Course Outcome:</b></p> <p>On completion of the course, students are able to:</p> <ol style="list-style-type: none"> <li>1. Understand the History of Computers.</li> <li>2. Understand What is Computer and Basic concepts of computer.</li> <li>3. Aware about various types of Computers, types of input and output devices.</li> <li>4. Understand the basics of Computer Networks</li> <li>5. Awareness of Internet and Search Engines</li> </ol>		

<b>DSC-1A Theory-II Title: Office Automation</b>		<b>Hours 30</b>
Unit 1	<p><b>MS Word:</b>  Features, Creating, Saving and Opening Documents in Word, Interface, Toolbars, Ruler, Menus, Keyboard 100 Shortcut, Editing, Previewing, Printing, &amp; Formatting a Document, Advanced Features of MS Word, Find &amp; Replace, Header &amp; footer, Setting Footnotes &amp; endnotes, Mail Merge, Tables-Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, creating Charts, Converting a word document into various formats like- Text, Rich Text format, Word perfect, HTML, PDF etc. Word Completion, Spell Checks.</p>	8
Unit 2	<p><b>MS Excel:</b>  Spread Sheet &amp; its Applications, Menus - main menu, Formula Editing, Formatting, Spreadsheet types. Inserting Clipart, Pictures etc, Manual breaks. Setting Formula in Excel: Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), using other Formula, group functions in Excel.  Working with Sheets : Labelling columns &amp; rows, Formatting-Font, Border &amp; Shading, Hiding/ Locking Cells, Anchoring objects, Sheet Name, Row height &amp; Column width, Visibility - Row, Column, Sheet, Security- sheet locking, Sheet background, Colour etc, Borders &amp; Shading – Shortcut keys. Creating Charts: Drawing. Printing, types of Charts, Pivot Tables.</p>	7
Unit 3	<p><b>MS Power point:</b>  Presentation : Opening new presentation, Different templates, setting backgrounds &amp; presentation layouts. Creating &amp; Formatting presentation: Setting Presentation style, Adding text to the Presentation, Adding style, Colour, gradient fills, Arranging objects, Adding Header &amp; Footer, Slide Background, Slide layout. Adding Graphics to the Presentation: Inserting pictures, movies, tables etc into presentation, Adding Effects to the Presentation: Setting Animation &amp; transition effect. Printing Handouts, Generating, Standalone Presentation viewer, Creating Professional Presentations.</p>	7
Unit 4	<p><b>MS Access:</b>  Introduction, Planning a Database, Access Screen Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases Creating Reports, Printing &amp; Print Preview, Importing data from other databases viz. MS Excel etc.</p>	8

	<b>Introduction to LibreOffice-</b> creating & Saving the Documents, Calc (spreadsheet), Impress (presentations), Advantages of LibreOffice.	
<p><b>Course Outcome:</b> On completion of the course, students will be able to:</p> <ol style="list-style-type: none"><li>1) Students will learn computer applications from basics to advance</li><li>2) Office Automation Will help the students in documenting the reports.</li><li>3) With the help of Office automation students can perform accounting operations</li><li>4) It will help to learn presentation skills</li><li>5) Using of open source applications</li></ol>		

<b>DSC-2A Theory-I Title: Logic Development With ‘C’ Programming</b>		<b>Hours 30</b>
Unit 1	<p><b>Introduction To Programming:</b> Introduction To Algorithm- Definition, Characteristics or features of algorithm, Examples of algorithm to solve problem</p> <p><b>Flow Charts:</b> Definition, characteristics or features of flowchart, symbols used in flowchart, Advantages and Limitations of Flow Charts, Examples of Flow Charts</p> <p><b>Pseudo Code:</b> Definition, characteristics or features of pseudo code, Examples of Pseudo Code</p>	7
Unit 2	<p><b>Introduction To C:</b> History and Features of C, <b>Structure of C Program,</b> Compilation and Execution of C, Keywords, Identifiers, Data Types: Primitive, Derived, User defined, Variables, Constants, #define</p> <p><b>Input / Output Functions:</b> scanf(), printf(), getch(), getchar(), putchar(), getche()</p> <p><b>Operators in C:</b> Arithmetic, logical, assignment, relational, bitwise, conditional, unary, sizeof, ternary</p> <p>Type Casting</p>	7
Unit 3	<p><b>Control Structure:</b> Decision Control Structure: simple if, if else, nested if, if else ladder, switch, switch vs if else Loop</p> <p>Control Structure: while, do while, for, nesting of loop, Unconditional Branching: break, continue, goto</p>	8
Unit 4	<p><b>Arrays:</b> Introduction &amp; definition of array, Types of array: One Dimensional, Two Dimensional, Multi-Dimensional</p> <p><b>String:</b> Introduction To string, String Manipulation, String Handling Function</p>	8
<p><b>Course Outcome:</b></p> <p>On completion of the course, students are able to:</p> <ol style="list-style-type: none"> <li>1. Develop their programming skills.</li> <li>2. Be familiar with programming environment with C Program structure.</li> <li>3. Declaration of variables and constants.</li> <li>4. Understand operators, expressions and preprocessors.</li> <li>5. Understand arrays , it's declaration and uses.</li> </ol>		

<b>DSC-2A Theory-II Title: Advanced Programming in C</b>		<b>Hours 30</b>
Unit 1	<p><b>Functions:</b> Introduction &amp; definition of function, Need or use of function, Types of Functions: Library functions, User defined function, Function Prototyping, Types of Functions: Function with argument without return value, Function with argument with return value, Function without argument with return value, Function without argument without return value, Nesting of Function, Recursion, Passing array and string to function, <b>Command line argument.</b></p> <p><b>Storage Class:</b> Automatic Storage Class, External Storage Class, Static Storage Class, Register Storage Class</p>	8
Unit 2	<p><b>Pointers:</b> Definition and declaration, Operation on pointer, Pointer Arithmetic, Types of Pointer: Dangling, Void , Null and Wild Pointers, Pointer and array, Pointer of pointer, Call by value and Call by reference, Pointer To Function</p> <p><b>Dynamic Memory Allocation:</b> Dynamic Memory Allocation Concept, malloc(), calloc(), free(), realloc()</p>	8
Unit 3	<p><b>Structure and Union:</b> Definition and declaration, Array inside structure, Array of structure, Passing structure to function , Pointer to structure, Nested structure, self referential structure,</p> <p>Size of and typedef, Definition and declaration of union , difference between structure, union and array</p>	7
Unit 4	<p><b>File Handling:</b> Declaring, Opening and Closing File, Different modes of the file, Manipulating character based file: fgetc() and fputc(), Manipulating integer based file: getw() and putw(), Manipulating string based file: fgets() and fputs(), Formatted I/O functions: fscanf(), fprintf(), Binary file handling: fread() &amp; fwrite(), Random file access</p> <p><b>Macros and Preprocessing:</b> Features of C pre-processor, Macro: Declaration, Expansion, File Inclusion</p> <p><b>Introduction To Graphics:</b> Introduction, VDU Basics, Simple library functions-getpixel, putpixel, line,rectangle, circle, ellipse, arc, kbhit()</p>	7
<p><b>Course Outcome:</b>  On completion of the course, students are able to:</p> <ol style="list-style-type: none"> <li>1. Design programs using Functions, Pointers , Structures and Unions in C language.</li> <li>2. Write a program using File Handling.</li> <li>3. Writing programs for drawing different graphical shapes.</li> </ol>		

<b>DSC-3A Theory-I Title:Discrete Structure</b>		<b>Hours 30</b>
Unit 1	Introduction: Introduction to Sets, Finite and Infinite Sets, Uncountably Infinite Sets, Pigeonhole Principle, Principle of Inclusion and Exclusion.	7
Unit 2	Definition and elementary results, Types of graph: Simple graph, Multi-graph, pseudo graph, complete graph, Null graph, Regular graph, k-regular graph, Bipartite graph, Complete bipartite graph, weighted graph, degree of a vertex, total degree of a graph, shaking hand lemma and elementary results, Adjacency and Incidence matrix.	7
Unit 3	Derived Graphs Sub graph, vertex deleted, and edge deleted subgraph, Complement of a graph & self complementary graph, vertex disjoint and edge disjoint subgraphs, Operations on Graphs: Union, intersection and ring sum of two graphs, Product of two graphs.	8
Unit 4	<b>Euler and Hamiltonian Graph</b> Walk, trail, path, Euler trail and circuit, Euler's graph, Fleury's algorithm. Chinese Postman problem Hamiltonian Path and Circuit, Hamiltonian Graph, travelling salesman problem.  <b>Trees:</b> Definition and properties of Trees, Spanning Trees, Shortest spanning tree, Kruskal's algorithm for shortest spanning tree, branches & chords, fundamental cut sets & circuits.	8
<p><b>Course Outcome:</b></p> <ol style="list-style-type: none"> <li>1. Demonstrate mathematical skills, analytical and critical thinking abilities.</li> <li>2. Demonstrate comprehension of discrete structures and their relevance within the context of computer science, in the areas of data structures and algorithms.</li> <li>3. Students completing this course will be able to use tree and graph algorithms to solve problems.</li> </ol>		



<b>DSC-3A Theory-II Title:Numerical Methods</b>		<b>Hours</b>
		<b>30</b>
Unit 1	<b>Solution of System of linear Equations &amp; Matrices:</b> Matrix , elementary matrices, System of linear equations, Homogeneous system of linear equation. solution of system by using Gauss elimination method (with row pivoting) and Gauss–Jordan elimination method, Iterative methods: Jacobi and Gauss-Seidel iterative methods.	7
Unit 2	<b>Errors in numerical calculations:</b> Floating point representation of real numbers,rounding off errors, absolute, relative and percentage errors, Arithmetic operation on normalized floating point numbers. <b>Solution of nonlinear equations:</b> Location of roots, bisection, regula-falsi and Newton Raphson method, Comparison of these methods and its rate of convergence.	8
Unit 3	Finite difference operators, relation between these operators, Gregory Newton forward and backward differences Interpolation, Lagrange’s interpolation formula. <b>Numerical integration:</b> General quadrature formula for equidistant ordinates, Trapezoidal rule,Simpson’s 1/3rd & 3/8th rule.	8
Unit 4	<b>Extrapolation Ordinary differential equation:</b> Definition,Degree and order of a differential equation, Definition of ordinary differential equation, Taylor’s series method, Euler’s method, Modified Euler’s methods, Runge-Kutta second order method, Classical 4th order Runge-Kutta method.	7
<b>Course Outcome:</b>		
<ol style="list-style-type: none"> <li>1. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.</li> <li>2. Apply numerical methods to obtain approximate solutions to mathematical problems.</li> <li>3. Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to mathematical problems.</li> </ol>		

<b>DSC-4A Theory-I Title:Linear Electronics-I</b>		<b>Hours 30</b>
Unit 1	<p><b>Basics of Electronics</b>  <b>AC Sources:</b> Concept of Single phase and three phase power supplies, RMS value, Fuses and Protection Circuits (MCB), Earthing.  <b>Basic Components:</b>Resistor, (Classification, Construction of Carbon Composition Resistor, Color Code, Specifications), Variable resistor (Potentiometer), Capacitor(Classification, charging and discharging, Specifications), Inductor (Classification, working, Specifications), Transformer, mutual induction, Step up and step down transformer</p>	8
Unit 2	<p><b>Circuit Theorems</b>  Ohm's Law, Kirchhoff's Law, Applications of Kirchhoff's Law, Thevenin's Theorem, Superposition Theorem, Maximum Power Transfer Theorem</p>	7
Unit 3	<p><b>Basic Semiconductor Devices and Applications</b>  P-N junction Diode, Zener Diode, Designing of DC Power Supply, Rectifiers (HWR and FWR), Filters (PI Filter), Regulator, Load and Line regulation, ,LED, Photodiode (Biasing and working principle),</p>	8
Unit 4	<p><b>Transistors and Thyristors</b>  Definition of Sensor , Types of Sensors: Temperature sensor, photo sensor, Humidity sensor, Proximity sensor  Definition of transducer, Static and dynamic characteristics, Types of transducers: resistive, capacitive and inductive</p>	7
<p><b>Course Outcome:</b></p> <ol style="list-style-type: none"> <li>1. Understand Basic Circuit components and their applications</li> <li>2. Learn basic circuit theorems and analysis of circuits by applying theorems</li> <li>3. Acquire the knowledge of semiconductor diodes and their applications</li> <li>4. Understand the current voltage characteristics of semiconductor devices, Analyze dc circuits and relate ac models of semiconductor devices with their physical Operation</li> <li>5. Students will be able to explain principle of operation for various sensors.</li> </ol>		

<b>DSC-4A Theory-II Title:Digital Electronics</b>		<b>Hours 30</b>
Unit 1	<b>Number Systems and Arithmetic</b> Decimal Number System & Binary Number System Decimal to Binary conversion (Double-dabble method only), Binary to Decimal Conversion, Decimal to Binary conversion (Double-dabble method only),Hexadecimal number system , Hexadecimal to binary, binary to Hexadecimal, Hexadecimal to decimal conversion ,Binary Arithmetic : Binary addition, subtraction, multiplication & division ,,Binary subtraction using 1' complement, 2's complement method, Excess-3 code, Gray code	7
Unit 2	<b>Logic Gates and Boolean Algebra</b> Logic Gates : AND, OR, NOT, NAND ,NOR ,Ex-OR, Ex-NOR , De Morgan's theorems,Universal building block, Postulates of Boolean Algebra, Reducing Boolean expressions ,Logic diagrams of Boolean expressions , SOP,POS (Minterms and Maxterms), K-Map, K-map for 2 variables K-map for 3 variables K-map for 4 variables minimization of boolean expression using K-Map.	8
Unit 3	<b>Combinational Logic Circuit</b> Half Adder & Full Adder , Binary parallel Adder, Half Subtractor, Full Subtractor , universal Adder/Subtractor, Multiplexer and Demultiplexer, different types of Multiplexer and Demultiplexer, encoders and decoders, pin function of IC 74150,74154, 74138,74148	7
Unit 4	<b>Sequential Circuit</b> <b>Flip flop:</b> Concept of flip-flop, types of F/F, RS F/F, Clocked RS F/F, D F/F Triggering (positive , negative ), preset and clear F/F, JK F/F , T F/F , Race around condition of JK F/F, Master slave JK F/F <b>Counters:-</b> Introduction to counter, types of counters-synchronous, Asynchronous, Asynchronous counter : 3-bit up counter, down counter , up-down counter ,Asynchronous counter / ripple counter: Modulus Counter , MOD-2, 5, 10 counter ,Synchronous 3 bit up counter, BCD counter, Ring counter, Johnson counter ,pin configuration of IC 7490 <b>Shift Registers:</b> Introduction register, types of shift register: Serial- in serial –out(left shift register, right shift register), Serial-in parallel-out , Parallel-in serial-out, parallel-in parallel-out, pin configuration of IC 7495	8
<b>Course Outcome:</b> <ol style="list-style-type: none"> <li>1. Convert different types of codes and number systems which are used in digital communication and computer systems.</li> <li>2. Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of performance and efficiency.</li> <li>3. Draw a circuit diagram for a sequential logic circuit and analyze its timing properties</li> </ol>		

<b>DSC-1B Theory-I Title: Web Technology- I</b>		<b>Hours 30</b>
Unit 1	<b>Introduction to Web Design</b> Brief History of Internet, Client and Server, World Wide Web, Need and uses of Website, Web Standards, Five Golden rules of web designing, Basic principles involved in developing a web site .	7
Unit 2	<b>Overview of HTML</b> Introduction to HTML, Structure of HTML, Creating and opening of HTML file, Tags—Singular and paired tags, Text formatting tags, Anchor Tags, List, Image, Table, Frames and frameset, Form tag, Input tags.	8
Unit 3	<b>Introduction to HTML5</b> Introduction to HTML5, Need of HTML5, Structure of HTML 5, Input tags in HTML5 (Placeholder, Autofocus, Required attributes), Graphics in HTML5, Media Tags in HTML5	7
Unit 4	<b>Introduction to CSS</b> Introduction to CSS, Use of CSS, Types of CSS, Types of Selectors, Properties—Background, Border, Text, Font, Margin, Padding, Box Model, Link, Lists, Table, Opacity, Floating, Animation, Multiple column layout, User Interface, 2D/3D transformation, overflow, Display, Positioning.	8
<p><b>Course Outcome:</b></p> <p>On completion of the course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand how to design websites with different website development models.</li> <li>2. Know the different page types on websites and its navigations.</li> <li>3. Designing websites using HTML and CSS .</li> </ol>		

<b>DSC-1B Theory-II Title: Web Technology- II</b>		<b>Hours 30</b>
Unit 1	<b>Introduction to JavaScript</b> Introduction to JavaScript, JavaScript Variables, Data types, Operators, User defined function in JavaScript, Control Structures in JavaScript,Popup boxes,DOM .	7
Unit 2	<b>Javascript Objects ,Validation and Eventhandling</b> JavaScript Objects- Object, Array,String, Date, Math,Number, Boolean,Validation in JavaScript, Event and Event handling in JavaScript.	8
Unit 3	<b>jQuery</b> Introduction to JQuery,Need of JQuery, Adding JQuery to webpage, JQuery Syntax, jQuery selectors. jQuery Effects,jQuery Events,jQuery HTML/CSS, jQuery noConflict().	8
Unit 4	<b>Introduction to Web Publishing or Hosting</b> Creating the Web Site, Saving the site, working on the web site, creating web site structure, Creating Titles for web pages, Publishing websites and how to apply templates.	7
<p><b>Course Outcome:</b></p> <p>On completion of the course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. understood how to apply validations</li> <li>2. Create effective scripts using JavaScript and jQuery to enhance the end user experience.</li> <li>3. understood how to publish and host the developed websites</li> </ol>		

<b>DSC-2B Theory-I Title: Object Oriented Programming-I</b>		<b>Hours 30</b>
Unit 1	<b>Principles of Object –Oriented Programming</b> Introduction to OOP, Features of OOP's- Class, Object, Data Abstraction, Data encapsulation, Data hiding, Message passing, polymorphism, inheritance, Comparison between POP (Procedural Oriented Programming) and OOP, Advantages of OOP's, History of C++ , Applications of C++ , Structure of C++ Program,A Simple C++ Program	8
Unit 2	<b>Tokens , Expressions and Control Structures</b> Keywords, identifiers, data types, variables, constants, operators, special symbols,Types of Variables- Value, pointer and reference, Introduction to cin and cout objects,Function and its types,Default value argument, Parameter passing methods, Static polymorphism (Function overloading)	7
Unit 3	<b>Classes and Objects</b> Introduction to class and object, Defining class (class specification), Creating object, Access specifier(Visibility modes)- public, protected, private, Class members- data members, member functions, Defining member function inside and outside the class, Inline function, Static data members and static member functions, Array of object, Returning object, Passing object as parameter by value, by pointer and by reference, Dynamic memory allocation (new, delete), Friend function and friend class, Nesting of classes.	8
Unit 4	<b>Constructors and Destructors</b> Constructor, Parameterized Constructor , Multiple Constructors in a class, Constructors with default arguments , Copy constructor ,Dynamic constructors, Destructors	7
<p><b>Course Outcome:</b> On completion of this course Students will understand what is object oriented programming and this will help them to learn other object oriented programming languages.</p>		

<b>DSC-2B Theory-II Title: Object Oriented Programming-II</b>		<b>Hours 30</b>
Unit 1	<b>Operator Overloading</b> Defining operator overloading, Overloading unary operator ,Overloading binary operator ,Rules for Operator Overloading , Operator overloading using friend function, overloading [ ], ( ), - ,comma operator	7
Unit 2	<b>Inheritance and Runtime Polymorphism:</b> Introduction and concept of inheritance, Types (Forms) of Inheritance- Single, Multi-level, Multiple, Hierarchical, Hybrid, Multi-path (Virtual base class), Behavior of constructors and destructor in inheritance, Pointer to base class., Pointer to derived class, Introduction and concept of runtime polymorphism, Virtual functions, Pure virtual function.	8
Unit 3	<b>Stream and Files:</b> Introduction to streams in C++, Stream classes, File stream classesFormatted and unformatted I/O functions and Manipulators, File Manipulations- Opening, closing, reading, writing, appending, Command line arguments.	8
Unit 4	<b>Exception Handling and Template:</b> Introduction to Exception, Exception handling mechanism- try, catch, throw keyword, catch-all exception handler, User defined exception, Introduction to class template, Introduction to function template	7
<b>Course Outcome</b> On completion of this course Students will understand how to share data between the classes,how to store data in file permanently, how to handle errors during program execution.		

<b>DSC-3B Theory-I Title:Mathematical Algebra</b>		<b>Hours 30</b>
Unit 1	Induction-Revision of first principle, Generalized first principle of finite induction. Sets - finite and Infinite sets, uncountably Infinite Sets.Ordered Pairs, Cartesian product of sets.	7
Unit 2	<b>Relation:</b> Definition, types of relation: identity, reflexive, symmetric, equivalence, antisymmetric, partial orderings, asymmetric. Diagraph of relations, Matrix representation of relation,in degree out degree of a vertex, transitive closure, Warshall's algorithm.	8
Unit 3	<b>Functions:</b> Definition of function as relation, domain, co-domain and range of a function,injective, surjective and bijective functions, inverse function, composition of functions.	7
Unit 4	<b>Propositional Calculus:</b> Proposition- Simple statement, Compound statement,Logical connectives, Disjunction, Conjunction, Negation, Implication, Double implication, Converse, inverse and contrapositive of conditional statement,truth tables, tautology, Contradiction & neither, commutative laws, associative laws, distributive laws, Demorgan's laws, logical equivalence.	8
<b>Course Outcome:</b> <ol style="list-style-type: none"> <li>1. Students completing this course will be able to express a logic sentence in terms of predicates, quantifiers, and logical connectives.</li> <li>2. Students completing this course will be able to proof by mathematical induction.</li> <li>3. Students completing this course will be able to evaluate Inverse functions</li> </ol>		



<b>DSC-3B Theory-II Title:Operation Research</b>		<b>Hours 30</b>
Unit 1	<b>Linear Programming Problem(LPP) :</b> Statement of LPP, formulation of problems as LPP, Definitions of Slack variables,surplus variables and artificial variable, standard form of LPP, Definitions of a solution, feasible solution, basic feasible solution and an optimum solution.	8
Unit 2	<b>Solution of LPP:</b> Solution of LPP by graphical method, simplex method,Duality Theory-Writing dual of primal problem	7
Unit 3	<b>Transportation Problem:</b> Statement of TP, balanced and unbalanced TP, methods of obtaining initial basic feasible solution of TP- North-West Corner method, method of matrix minima and Vogel's approximation method.	7
Unit 4	<b>Optimum solution of TP-</b> MODI Method of obtaining an optimal solution of TP. <b>Assignment problem:</b> Statement of AP, balanced and unbalanced AP, relation with TP, Optimal solution of AP by using Hungarian method.	8
<b>Course Outcome:</b> <ol style="list-style-type: none"> <li>1. Be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.</li> <li>2. Be able to build and solve Transportation Models and Assignment Models.</li> </ol>		

<b>DSC-4B Theory-I Title:Linear Electronics-II</b>		<b>Hours 30</b>
Unit 1	<b>Multivibrators ,Oscillator and Amplifiers</b> Multivibrator: Introduction and applications of multivibrator, IC-555, Astable and Monostable multivibrator (Operation, Wave forms, only Expression for frequency and duty cycle) Oscillator: Introduction to oscillator, crystal oscillator Operational Amplifier: Introduction, Block diagram of Op-Amp, Ideal characteristics of IC 741, Inverting and Non-inverting amplifier using Op-Amp	8
Unit 2	<b>Audio, Video and IO</b> Seven Segment Display, Bar Chart, Dot Matrix Display, LCD, Opt coupler, Speaker, MIC, Buzzer	7
Unit 3	<b>Sensors and Transducers</b> Definition of Sensor , Types of Sensors: Temperature sensor, photo sensor, Humidity sensor, Proximity sensor Definition of transducer, Static and dynamic characteristics, Types of transducers: resistive, capacitive and inductive	8
Unit 4	<b>Motors</b> DC Motor, Brushless Motor, Stepper Motor, Servomotor, AC Motor (working and application only)	7
<b>Course Outcome:</b> 1. Know about the multivibrators, oscillators and amplifiers in various configuration 2. understand the working of various display devices 3. Students will be able to explain principle of operation for various motors.		

<b>DSC-4B Theory-II Title:Digital Electronics and Microprocessor</b>		<b>Hours 30</b>
Unit 1	<b>Programmable Logic:</b> Basic building and types of Simple Programmable Logic Devices (SPLDs) - PLDs,PLA,PAL , Complex Programmable Logic Devices (CPLDs)-Basic building blocks,Functionality	7
Unit 2	<b>Data Converters:</b> Basic concepts of DAC and ADC, specifications Digital to analog conversion: Binary weighted and R - 2 R ladder networks Analog to digital conversion: Successive approximation method, Dual slope	8
Unit 3	<b>Semiconductor Memories</b> Memory cell, Memory organization, operation and parameters. types of memory, RAM(Static, Dynamic), pin connection of RAM chip, Classification of ROM (PROM, EPROM), dot matrix PROM, read-write operation of memory, memory parameter, Flash memory	7
Unit 4	<b>Fundamentals of Microprocessor</b> Introduction to microprocessor, Basic system with Bus Architecture Intel 8085 Microprocessor: Features, Architecture, Pin Description. Clock & reset circuit,Concepts of T-state, Machine cycle, Instruction cycle. Concept of I/O mapped I/O and Memory mapped I/O techniques.Programming with Microprocessor: Instruction set of 8085, Instruction format, Addressing modes, Classification of instructions, Assembly language programming of Data transfer, Arithmetic, logical & Branch operations. (8-bit only).	8
<b>Course Outcome:</b> <ol style="list-style-type: none"> <li>1. Understand the various programmable logic devices and data convertors</li> <li>2. Get the knowledge of various memory types</li> <li>3. Access the basic knowledge of the microprocessor 8085 and explain its internal architecture and its operation within the area of manufacturing and performance.</li> <li>4. Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor.</li> <li>5. Study of interface IC's in order to interface the processor to external devices.</li> <li>6. Evaluate assembly language programs to perform various basic operations</li> </ol>		

<b>DSC-1A &amp; DSC-1B Practical-I</b>	
Experiment	Title
1	Demonstration of all peripherals of computer with its functionality
2	Demonstration of Memory devices in detail
3	DOS – external and internal commands, batch files commands
4	Demonstration of networking connectivity functionalities (LAN Settings, LAN Cables, etc)
5	Internet – creating e – mail accounts, browsing
6	MS – WORD – Creating new documents, typing, deleting, selecting text, undo, Redo, formatting text – auto format, formatting characters, Paragraphs, line spacing, margins, page setup, headers and footers, Writer’s tools – spelling checker, auto format, auto correct, find and replace Mail merge – Data source, Main document, creating mail merge document
7	MS – EXCEL - Creating worksheet, Graphs, resizing graphs, formulas, types of functions
8	MS-PowerPoint-Creating presentation, slideshow, adding slides, inserting clip arts, smart art, images, sound files, linking Etc
9	Creating a Database with the MS- Access, creating forms and fetching data in reports
10	Creating documents and Presentations using LibreOffice
11	Design HTML page to display student Information
12	Design HTML page for all lists.
13	Design HTML page for Image, table, frameset tags.
14	Design a webpage that should contain given HTML5 attributes(Placeholder, autofocus, Required etc)
15	Create a web page using the Internal/Linked/External style sheet using Text formatting properties, CSS Borders, Margin Properties, Color properties, Use DIV and SPAN tag properties.

16	Write a JavaScript code working with functions: the alert Box, the confirm Box, the prompt Box etc.
17	Solve Following program using JAVA Script to check given number is i) even or odd ii) Prime or not iii) Palindrome or not. iv) perfect or not
18	Write a JavaScript code block using objects: String Object, Boolean Object, Number Object, Date Object, Math Object.
19	Design student registration form with validation.
20	Design a webpage that uses JQuery Hide and show effect.
21	Design a homepage of online shopping.

<b>DSC-2A &amp; DSC-2B Practical-I</b>	
Experiment	Title
1	Write a Program to convert the Temperature in centigrade degree to the Fahrenheit degree.
2	Check whether given number is even or odd.
3	Write a program to find out First Fifty Prime numbers.
4	Write a program to find GCD & LCM of given number.
5	Write a program to convert given Binary number into its Octal/Decimal, Hexadecimal Equivalent.
6	Write a program to display Fibonacci series.
7	Write a Recursive function to find out the Factorial of Given Number.
8	Write a program to reverse the given number.
23	Write a program to calculate Matrix Addition, Multiplication using Functions as well as without Functioning.
9	Write a program to find a given string is Palindrome or not using function.

10	Write a program that accepts the Roll No, Name, Marks obtained in three tests of 'N' students & display the total and Average in tabular format.
11	Write a program which uses simple graphics functions.
12	Write a program to demonstrate macro substitution.
13	Write a program to demonstrate file inclusion mechanism.
14	Write a program to count the no. of words in a given text file.
15	Write a program copy one file into another file
16	Write a program to accept two integer values and swap the values without using third variable.
17	Write a program to implement call by reference .
18	Write a program to implement function overloading .
19	Write a program to implement default arguments.
20	Write a program to implement type casting .
21	Write a program to implement class and object assuming a suitable employee structure.
22	Write a program to hold and display 5 employee records . Assume a suitable Employee structure.
23	Write a program to implement Constructor and Destructor.
24	Write a program to implement Copy Constructor .
25	Write a program to implement Single Inheritance.
26	Write a program to implement Multilevel Inheritance.
27	Write a program to implement Multiple Inheritance.
28	Write a program to implement Hybrid Inheritance
29	Write a program to implement Runtime Polymorphism
30	Write a program to demonstrate use of Abstract class
31	Write a program to overload ++ operator using member function
32	Write a program to overload ++ operator using friend function
33	Write a program to overload +operator using member function
34	Write a program to overload + operator using friend function
35	Write a program to create user defined manipulator
36	Write a program to count number of vowels in a file
37	Write a program to count number of tabbed spaces,number of lines,number of spaces and number of characters in a file
38	Write a program to copy contents of one file into another file using command line argument

39	Write a program to append the contents into a file after reading string input from the user.
40	Write a program to write employee record into the file and read the same record from the file .Assume a suitable employee structure.
41	Write a program to demonstrate class template
42	Write a program to demonstrate function template
43	Write a program to demonstrate function template with multiple arguments
45	Write a program to demonstrate function overloading using function template.

<b>DSC-3A &amp; DSC-3B Practical-I</b>	
Experiment	Title
1	Matrix representation of graph: Adjacency and incidence matrix.
2	Operations on graphs: Union, intersection, ring sum, product of two graphs.
3	Solution of Chinese Postman Problem for both Euler's and non-Euler's Graph.
4	Solution of Travelling Salesman Problem.
5	Fleury's algorithm.
6	Kruskal's algorithm for weighted spanning tree.
7	Fundamental circuits and fundamental cut sets.
8	Inverse of a matrix: row reduction method, adjoint method.
9	Find the solution of the system of equations by using Gauss elimination method and Gauss Jordan Method.
10	Find the solution of the system of equations using Jacobi and Gauss-Seidel method.
11	Find the roots of the nonlinear equation by bisection method.
12	Find the roots of the nonlinear equation by Regula falsi method
13	Find the roots of the nonlinear equation by Newton Raphson method.
14	Interpolation: Newton's both forward and backward interpolation, Lagrange's interpolation.
15	Numerical integration: Trapezoidal rule, Simpson's 1/3rd and 3/8th rule.
16	Relations- Diagraph of relations, matrix representation, transitive closure and

	Warshall's algorithm.
17	Problems on LPP by Graphical method.
18	Problems on LPP by Simplex method.
19	Problems on TP.
20	Problems on AP.

<b>DSC-4A &amp; DSC-4B Practical-I</b>	
Experiment	Title
1	Introduction to components
2	Kirchoff's Laws
3	Characteristics of Semiconductor Diode
4	Characteristics of Zener Diode
5	Half wave and Full wave rectifier
6	7805 and 7905 regulators
7	Characteristics of CE configuration
8	Transistor as a switch
9	Opamp as inverting and non inverting amplifier
10	Crystal Oscillator
11	Study of Photo sensor
12	Astable multivibrator
13	Study of Logic gate
14	Study De Morgan's Theorems
15	Study of Universal Gates
16	Study Half and Full Adder
17	Study of RS flip flop
18	Study of Multiplexer and Demultiplexer
19	Study of Encoder (74148) and Decoder (74138)
20	Study of Counters (divided by 2, 5 and 10) using IC-7490
21	Study of Left shift and Johnson counter using IC 7495



22	Study Right shift and Ring counter using IC7495
23	Addressing modes using 8085 $\mu$ p
24	Arithmetic operations using 8085 $\mu$ p
25	Data transfer operations using 8085 $\mu$ p

<b>List of Books:DSC-1A &amp; DSC-1B</b>			
	Title	Authors	Publisher
1	Computer Fundamentals	P.K. Sinha , Priti Sinha	BPB Publication
2	Computer Today	S.Basandra	Galgotia
3.	Computer Fundamental MS-Office	Anupama Jain,Avneet Mehra	Vitasta Publishing Pvt.Ltd
4.	MS-OFFICE Training Guide	Satish Jain M. Geetha, Kratika	BPB pub.
5.	Getting Started with LibreOffice 6.0	-	Libreoffice Documentation Team
6.	HTML5 Black Book	Kogent Learning Solutions Inc	Dreamtech Press
7.	Beginning HTML and CSS	Rob Larsen.	Wrox Publication
8	HTML_&_CSS_The_Complet e_Reference	Thomas A. Powell. (Fifth Edition).	McGraw Hill Education.
9	Computer Fundamentals MS Office-Including Internet and Web technology	Anupam Jain ,Navneet Mehra .	Vitasta Publishing Pvt.Ltd.
10	MS Office Training guide	Satish Jain, Geeta Kratika	BPB Publication

<b>List of Books:DSC-2A &amp; DSC-2B</b>			
	Title	Authors	Publisher
1	Programming in ANSI-C	E. Balgurusamy	McGraw Hill Education.
2	Let Us C	Y.C. Kanetkar.	BPB Publication

3.	The C Programming language	Ritchie and Kernighan	Prentice Hall
4.	A structure programming approach using C	Behrouz A.Forouzan, Richard F.	Gilberg
5	OOP in C++	E. Balgurusamy	McGraw Hill Education.
6	Mastering C++	K.R. Venugopal	Tata McGraw Hill,
7	Structured approach using C++	Behrouz A. Forouzan	Cengage Learning; 2 edition (15 November 2012)
8	The Complete ReferenceC++	Herbert Schildt	Tata McGraw-Hill

<b>List of Books: DSC-3A &amp; DSC-3B</b>			
	Title	Authors	Publisher
1	Elements of Discrete Mathematics	C.L.Liu	Tata McGraw Hill.
2	Introduction to Numerical Analysis..	S. S. Sastri	Tata McGraw Hill.
3	Elements of Discrete mathematics, 2nd Edition.	C. L. Liu, D. P. Mahopatra	Tata McGraw Hill, 1985.
4	Discrete Mathematical structure for Computer Science	Alan Doerr and K Levassuer	Pearson Education, Inc
5	Operations Research	H.A.Taha	Prentice-Hall, Inc.
6	Operations Research	Kantiswarup Gupta	sultan chand & sons

<b>List of Books: DSC-4A &amp; DSC-4B</b>			
	Title	Authors	Publisher
1	Principle of Electronics (new e/d)	V.K.Mehta	S. Chand & Co., X Edition
2	Electronics Principle	Malvino	Mc Graw Hill
3	Modern Digital electronics	R.P.Jain	Mc Graw Hill, IV Edition
4	Digital principle & applications	Malvino Leech	New Age International Publication
5	Digital principle	Floyed	Pearson Education
6	Sensors and Transducers	Patranabis D	Prentice Hall India Learning Private Limited; 2 edition (2003)
7	Microprocessor Architecture, Programming, and Applications with the 8085	Ramesh Gaonkar	Penram International Publishing Pvt. Ltd