Shri Sangameshwar Education Society's

Sangameshwar College, Solapur [Autonomous]

(Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur)

Kannada Linguistic Minority Institute

NAAC Accredited with 'A' Grade (III Cycle CGPA 3.39)

STRUCTURE OF B.Sc ECS PROGRAMME UNDER CBCS PATTERN

Faculty of Science

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 / Office Automation	4	5	4
		Practical-I	3.2	4	2
	DSC-2A	Logic Development With 'C' Programming / Advanced Programming in C	4	5	4
		Practical-I	3.2	4	2
	DSC-3A	Discrete Structure / Numerical Methods	4	5	4
		Practical-I	3.2	4	2
	DSC-4A	Linear Electronics-I / Digital Electronics	4	5	4
		Practical-I	3.2	4	2
	Total		32	40	26
II	AECC-B	English Communication-II	3.2	4	2
	DSC-1B	Web Technology -I / Web Technology -II	4	5	4
		Practical-I	3.2	4	2
	DSC-2B	Object Oriented Programming-I / Object Oriented Programming-II	4	5	4
		Practical-I	3.2	4	2
	DSC-3B	Mathematical Algebra / Operations Research	4	5	4
		Practical-I	3.2	4	2
	DSC-4B	Linear Electronics-II / Digital Electronics and Microprocessor	4	5	4
		Practical-I	3.2	4	2
	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 Marks			Credits
			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
	Total		**135**	**315**	**450**	**18**
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
		Operations 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	--
		Total	**255+15**	**595+35**	**850+50**	**34**
		Total Semester I and II	**390+15**	**910+40**	**1300+50**	**52**

DETAILED SYLLABUS
Of
COURSES OFFERED BY THE PROGRAMME

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Fundamentals of Computer

Course Code: DSC-1A Theory-I **Total Hours 30** **Course Credits 2**

Course Objectives:

The basic objective of the Course: Students should be able to explain the basics of computers and the basic skills to use computers in their daily work using standard packages.

Unit No	Content	Hrs.
1	**Introduction to Computer** 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
2	**Computer Memory, I/O devices** 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
3	**Operating System Concept:** 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
4	**Computer Communication and Networks:** 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

Co No	Expected Course Outcomes *On completion of this course, the students will be able to:*
1	Understand the History of Computers.
2	Understand What is Computer and Basic concepts of computer.
3	Aware about various types of Computers, types of input and output devices.
4	Understand the basics of Computer Networks
5	Awareness of Internet and Search Engines

Suggested Readings:

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

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Office Automation

Course Code: DSC-1A Theory-II **Total Hours 30** **Course Credits 2**

Course Objectives:

The basic objective of this course is to enable students to create professional Word documents and Excel. Spreadsheets, PowerPoint presentations using Microsoft Office Tools Suite.

Unit No	Content	Hrs.
1	**MS Word:** Features, Creating, Saving and Opening Documents in Word, Interface, Toolbars, Ruler, Menus, Keyboard 100 Shortcut, Editing, Previewing, Printing,& Formatting a Document, Advanced Features of MS Word, Find & Replace, Header & footer, Setting Footnotes & 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.	8
2	**MS Excel:** Spread Sheet & 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 & rows, Formatting- Font, Border & Shading, Hiding/ Locking Cells, Anchoring objects, Sheet Name, Row height & Column width, Visibility - Row, Column, Sheet, Security- sheet locking, Sheet background, Colour etc, Borders & Shading – Shortcut keys. Creating Charts: Drawing. Printing, types of Charts, Pivot Tables.	7
3	**MS Power point:** Presentation : Opening new presentation, Different templates, setting backgrounds & presentation layouts. Creating & Formatting presentation: Setting Presentation style, Adding text to the Presentation, Adding style, Colour, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation: Inserting pictures, movies, tables etc into presentation, Adding Effects to the Presentation: Setting Animation & transition effect. Printing Handouts, Generating, Standalone Presentation viewer, Creating Professional Presentations.	7
4	**MS Access:** Introduction, Planning a Database, Access Screen Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases Creating Reports, Printing & Print Preview, Importing data from other databases viz. MS Excel etc. Introduction to LibreOffice- creating & Saving the Documents, Calc (spreadsheet), Impress (presentations), Advantages of LibreOffice.	8

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Students will learn computer applications from basics to advance
2	Office Automation Will help the students in documenting the reports.
3	With the help of Office automation students can perform accounting operations

4	It will help to learn presentation skills
5	Using open source applications

Suggested Readings:

1. Marketing Research – G.C. Beri – Tata McGraw Hill.
2. Research Methodology – C.R. Kothari – New Age International Publication.
3. Marketing Research - Nargundkar- Tata McGraw Hill.

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Logic Development With 'C' Programming

Course Code: DSC-2A Theory-I **Total Hours 30** **Course Credits 2**

Course Objectives:

The basic objective of the course is to gain knowledge about structured programming language and develop skills for writing programs using 'C' basic concepts.

Unit No	Content	Hrs.
1	**Introduction To Programming:** Introduction To Algorithm- Definition, Characteristics or features of algorithm, Examples of algorithm to solve problem Flow Charts: Definition, characteristics or features of flowchart, symbols used in flowchart, Advantages and Limitations of Flow Charts, Examples of Flow Charts Pseudo Code: Definition, characteristics or features of pseudo code, Examples of Pseudo Code	7
2	**Introduction To C:** History and Features of C, Structure of C Program, Compilation and Execution of C, Keywords, Identifiers, Data Types: Primitive, Derived, User defined, Variables, Constants, #define Input / Output Functions: scanf(), printf(), getch(), getchar(), putchar(), getche() Operators in C: Arithmetic, logical, assignment, relational, bitwise, conditional, unary, sizeof, ternary Type Casting	7
3	**Control Structure:** Decision Control Structure: simple if, if else, nested if, if else ladder, switch, switch vs if else Loop Control Structure: while, do while, for, nesting of loop, Unconditional Branching: break, continue, goto	8
4	**Arrays:** Introduction & definition of array, Types of array: One Dimensional, Two Dimensional, Multi-Dimensional String: Introduction To string, String Manipulation, String Handling Function	8

Co No	**Expected Course Outcomes** *On completion of this course, the students should be able to:*
1	Acquire the knowledge of how to write algorithm,flowchart and pseudo code of given problem
2	Acquire the basic knowledge of data types,operators and expressions.
3	Implement the Program by using conditional Statement and looping Statement.
4	Describe the concept of Array and it's types and develop the program by using Array.
5	Perform operations on String by using String handling functions.

Suggested Readings:

1. Programming in ANSI-C By E. Balgurusamy
2. Let Us C by Y.C. Kanetkar.
3. The C Programming language by Ritchie and Kernighan

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Advanced Programming in C

Course Code: DSC-2A Theory-II **Total Hours 30** **Course Credits 2**

Course Objectives:

The basic objective of the course is to acquire the knowledge of the
Advanced Programming concepts like function, pointer, structure,File Handling and Graphics concept.

Unit No	Content	Hrs.
1	Functions: Introduction & 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, Command line argument. Storage Class: Automatic Storage Class, External Storage Class, Static Storage Class, Register Storage Class	8
2	Pointers: 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 Dynamic Memory Allocation: Dynamic Memory Allocation Concept, malloc(), calloc(), free(), realloc()	8
3	Structure and Union: Definition and declaration, Array inside structure, Array of structure, Passing structure to function , Pointer to structure, Nested structure, self referential structure, Size of and typedef, Definition and declaration of union , difference between structure, union and array	7
4	File Handling: 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() & fwrite(), Random file access Macros and Preprocessing: Features of C pre-processor, Macro: Declaration, Expansion, File Inclusion Introduction To Graphics:Introduction, VDU Basics, Simple library functions-getpixel, putpixel, line,rectangle, circle, ellipse, arc, kbhit()	7

Co No	**Expected Course Outcomes** *On completion of this course, the students should be able to:*
1	Acquire the knowledge of functions and types of functions and develop the program by using function concept.
2	Illustrate the different types of storage classes.
3	Explain pointer and it's types and Develop the program by using pointer.
4	Implement the program by using dynamic memory allocation.
5	Develop mini-project by using File handling and graphics concepts.

Suggested Readings:

1. Marketing Research – G.C. Beri – Tata McGraw Hill.
2. Research Methodology – C.R. Kothari – New Age International Publication.
3. Marketing Research - Nargundkar- Tata McGraw Hill.

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Discrete Structure

Course Code: DSC-3A Theory-I **Total Hours 30** **Course Credits 2**

Course Objectives: This course is intended primarily to introduce a number of discrete structures that serve as important tools for the development of theoretical computer science. Students will learn how graph theory can contribute to simulation of a problem in computer science and engineering. There is a focus on how discrete structures actually helped computer engineers solve problems related to programming languages.

Unit No	Content	Hrs.
1	Introduction: Introduction to Sets, Finite and Infinite Sets, Uncountably Infinite Sets, Pigeonhole Principle,Principle of Inclusion and Exclusion.	7
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
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
4	Euler and Hamiltonian Graph Walk, trail, path, Euler trail and circuit, Euler's graph,Flurey's algorithm.Chinese Postman problem Hamiltonian Path and Circuit, Hamiltonian Graph, travelling salesman problem. Trees: Defination and properties of Trees, Spanning Trees, Shortest spanning tree, Kruskal's algorithm for shortest spanning tree, branches & chords, fundamental cut sets & circuits.	8

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Seek the knowledge of set theory, partition of sets, inclusion and exclusion principles.
2	State the concept of graphs, enumerate the types of graphs and their applications in practical situations.
3	Acquire the concepts of subgraph and draw or perform union, intersection and ring sum of graphs.
4	Demonstrate comprehension of discrete structure and their relevance within the context of computer science, in the areas of data structures and algorithms.
5	Describe the concepts and properties of trees.

Suggested Readings:

1. Elements of Discrete Mathematics-C.L.Liu-Tata McGraw Hill.

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Numerical Methods

Course Code: DSC-3A Theory-II Total Hours 30 Course Credits 2

Course Objectives: The basic objective of this course is to obtain an intuitive and working, understanding of numerical methods like System of linear equation and matrices, errors in numerical calculations, Numerical differentiation, integration and ordinary differential equations, for the basic problems of numerical analysis. It provides the knowledge of numerical method techniques for mathematical modeling.

Unit No	Content	Hrs.
1	Solution of System of linear Equations & Matrices: Matrix , elementary matrices, System of linear equations, Homogeneous system of linear equations. 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
2	Errors in numerical calculations: Floating point representation of real numbers,rounding off errors, absolute, relative and percentage errors, Arithmetic operation on normalized floating point numbers. Solution of nonlinear equations: Location of roots, bisection, regula-falsi and Newton Raphson method, Comparison of these methods and its rate of convergence.	8
3	Finite difference operators, relation between these operators, Gregory Newton forward and backward differences Interpolation, Lagrange's interpolation formula. Numerical integration: General quadrature formula for equidistant ordinates, Trapezoidal rule,Simpson's 1/3rd & 3/8th rule.	8
4	Extrapolation Ordinary differential equation: 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

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Solve the system of linear equations by using Gauss elimination and Jordan method.
2	Investigate and find the solution of nonlinear equations using different numerical methods (Bisection method, Regula Falsi method, Newton Raphson method) under different conditions and Compare different methods in numerical analysis w.r.t accuracy and efficiency of solution.
3	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.
4	Demonstrate the ability to interpret a differential equation qualitatively and Solve a variety of differential equations analytically and numerically. Using appropriate numerical methods determine the approximate solution of ODE and system of linear equations.

Suggested Readings:

1. Introduction to Numerical Analysis..-S. S. Sastri-Tata McGraw Hill.

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Linear Electronics-I

Course Code: DSC-4A Theory-I **Total Hours 30** **Course Credits 2**

Course Objectives: This course provides the student with the fundamental skills to understand the basic of semiconductor and components like diode, transistor, FET, MOSFET . It will build basic background for design of electronics circuit & component value. Students equipped with the knowledge and training provided in the course will be able to participate in design , development and operation in the different area of electronics system .

Unit No	Content	Hrs.
1	Basics of Electronics AC Sources: Concept of Single phase and three phase power supplies, RMS value, Fuses and Protection Circuits (MCB), Earthing. Basic Components: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	8
2	Circuit Theorems Ohm's Law, Kirchhoff's Law, Applications of Kirchhoff's Law, Thevenin's Theorem, Superposition Theorem, Maximum Power Transfer Theorem	7
3	Basic Semiconductor Devices and Applications 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),	8
4	Transistors and Thyristors Basics of BJT(construction, symbol and biasing of NPN Transistor), CE amplifier, FET(JFET and D/E MOSFET)construction, symbol and biasing , UJT, SCR, Diac and Triac (Definition, symbol and use only)	7

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Acquire concepts of Basic Electrical signals
2	Describe the working of basic electronics components
3	Classify the different networks theorems and use of it
4	Acquire basic knowledge on the working of various semiconductor devices
5	Develop analysis capability in BJT and FET Amplifier Circuits

Suggested Readings:

1. Marketing Research – G.C. Beri – Tata McGraw Hill.
2. Research Methodology – C.R. Kothari – New Age International Publication.
3. Marketing Research - Nargundkar- Tata McGraw Hill.

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Digital Electronics

Course Code: DSC-4A Theory-II Total Hours 30 Course Credits 2

Course Objectives: To acquire the basic knowledge of digital logic levels and application of digital electronics circuits. Provide hands-on experience in digital circuits, which can be constructed by using standard integrated circuits (ICs). Investigate the operation of several digital circuits of combinational and sequential.

Unit No	Content	Hrs.
1	Number Systems and Arithmetic 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
2	Logic Gates and Boolean Algebra 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
3	Combinational Logic Circuit 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
4	Sequential Circuit Flip flop: 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 Counters:- 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 Shift Registers: 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

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Covert one number system into another Number system
2	Write the working of different Logic gates and construction universal building blocks using NAND and NOR gates
3	Describe the use of Boolean and K Map simplification methods

4	Construct basic combinational circuits and verify their functionalities
5	Differentiate between combinational and sequential logic circuits C
6	Design of Counters and Register

Suggested Readings:

1. Marketing Research – G.C. Beri – Tata McGraw Hill.
2. Research Methodology – C.R. Kothari – New Age International Publication.
3. Marketing Research - Nargundkar- Tata McGraw Hill.

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – II) (W.E.F. JUNE 2020)

Course Title: Web Technology -I

Course Code: DSC-1B Theory-I **Total Hours 30** **Course Credits 2**

Course Objectives:

The basic objective of the course is Writing code in HTML and CSS, Personalizing internet pages, the use of textual content formatting, graphics, audio, and video,and planning and layout an internet utility from scratch.

Unit No	Content	Hrs.
1	Introduction to Web Design 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
2	Overview of HTML 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
3	Introduction to HTML5 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
4	Introduction to CSS 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

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Understand the basic principles and standards of standard web design
2	Understand how to design websites with different website development models.
3	Know the different page types on websites and it's navigations.
4	Designing websites using HTML and CSS

Suggested Readings:

1. Marketing Research – G.C. Beri – Tata McGraw Hill.
2. Research Methodology – C.R. Kothari – New Age International Publication.
3. Marketing Research - Nargundkar- Tata McGraw Hill.

SANGAMESHWAR COLLEGE,
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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Web Technology -II

Course Code: DSC-1B Theory-II **Total Hours 30** **Course Credits 2**

Course Objectives:

The basic objectives of the course is to design and build rich interactive web applications,Creating interactive user interfaces and hosting the created sites.

Unit No	Content	Hrs.
1	Introduction to JavaScript Introduction to JavaScript, JavaScript Variables, Data types, Operators, User defined function in JavaScript, Control Structures in JavaScript,Popup boxes,DOM .	7
2	Javascript Objects ,Validation and Eventhandling JavaScript Objects- Object, Array,String, Date, Math,Number, Boolean,Validation in JavaScript, Event and Event handling in JavaScript.	8
3	jQuery Introduction to JQuery,Need of JQuery, Adding JQuery to webpage, JQuery Syntax, jQuery selectors. jQuery Effects,jQuery Events,jQuery HTML/CSS, jQuery noConflict().	8
4	Introduction to Web Publishing or Hosting 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

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	understand Javascript and increase the interactivity of their website.
2	understand how to solve practical web design problems.
3	understand how to use jQuery to create effective scripts to improve the end-user experience.
4	understood how to publish and host the developed websites

Suggested Readings:

1. Marketing Research – G.C. Beri – Tata McGraw Hill.
2. Research Methodology – C.R. Kothari – New Age International Publication.
3. Marketing Research - Nargundkar- Tata McGraw Hill.

SANGAMESHWAR COLLEGE,
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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Object Oriented Programming-I

Course Code: DSC-2B Theory-I **Total Hours 30** **Course Credits 2**

Course Objectives:

The objective of course is to develop programming skills of students, using object oriented programming concepts, learn the concept of class and object using C++ and develop classes for simple applications.

Unit No	Content	Hrs.
1	Principles of Object –Oriented Programming 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
2	Tokens , Expressions and Control Structures 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
3	Classes and Objects 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
4	Constructors and Destructors Constructor, Parameterized Constructor , Multiple Constructors in a class, Constructors with default arguments , Copy constructor ,Dynamic constructors, Destructors	7

Co No	**Expected Course Outcomes** *On completion of this course, the students should be able to:*
1	Acquire the knowledge of object Oriented Concept.
2	Explain the difference between Procedure oriented Programming and Object Oriented programming.
3	Describe the concept of function overloading, Parameter passing methods
4	Acquire the knowledge of access specifier,static data member, static member function and Write the effective program with the help of these concepts.
5	Demonstrate the use of constructor and destructor with the help of program.

Suggested Readings:

1. Marketing Research – G.C. Beri – Tata McGraw Hill.
2. Research Methodology – C.R. Kothari – New Age International Publication.
3. Marketing Research - Nargundkar- Tata McGraw Hill.

SANGAMESHWAR COLLEGE,
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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Object Oriented Programming-II

Course Code: DSC-2B Theory-II **Total Hours 30** **Course Credits 2**

Course Objectives:

The objective of course is to develop programming skills of students, using object oriented programming concepts, learn the concept of operator overloading, Inheritance and Run-time polymorphism,stream and files, exception handling and template concepts.

Unit No	Content	Hrs.
1	Operator Overloading Defining operator overloading, Overloading unary operator ,Overloading binary operator ,Rules for Operator Overloading , Operator overloading using friend function, overloading [ ], ( ), - ,comma operator	7
2	Inheritance and Runtime Polymorphism: 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
3	Stream and Files: 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
4	Exception Handling and Template: 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

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Acquire the knowledge of operator overloading and overload different types of binary and unary operators in Program.
2	Develop reusable programs using the concepts of Inheritance and Polymorphism.
3	Classify the different types of inheritance and use them in Program.
4	Demonstrate the concept of virtual function and pure virtual function with the help of Program.
5	Handle the run time error by using exception handling mechanism and develop Generic Programming with the help of class and function template.

Suggested Readings:

1. OOP in C++ by E. Balgurusamy - McGraw Hill Education.
2. Mastering C++ by K.R. Venugopal - Tata McGraw Hill,
3. The Complete ReferenceC++ by Herbert Schildt - Tata McGraw-Hill

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Course Title: Mathematical Algebra

Course Code: DSC-3B Theory-I **Total Hours 30** **Course Credits 2**

Course Objectives: Throughout the course, students will get an overview of discrete mathematics, topics such as logic and proofs, sets, relation and function and other important discrete math concepts. This course serves as a gateway for a number of subjects in computer science and engineering.

Unit No	Content	Hrs.
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
2	Relation: 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
3	Functions: Definition of function as relation, domain, co-domain and range of a function,injective, surjective and bijective functions, inverse function, composition of functions.	7
4	Propositional Calculus: 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

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Prove formulas that are valid for all n N by using the principle of mathematical induction.
2	Illustrate relations between two sets and determine if the relation is partial order relation or equivalence relation using set operations.
3	Determine whether the function is one-one, onto and inverse of function.
4	State an argument using logical notation and determine if the argument is valid or invalid.

Suggested Readings:

1. Elements of Discrete mathematics, 2nd Edition.-C. L. Liu, D. P. Mahopatra -Tata McGraw-Hill, 1985.
2. Discrete Mathematical structure for Computer Science -Alan Doerr and K Levassuer-Pearson Education, Inc

Course Title: Operations Research

Course Code: DSC-3B Theory-II **Total Hours 30** **Course Credits 2**

Course Objectives: The objective of this course is to impart knowledge in concepts and tools of operation research. It also helps in applying these techniques constructively to make effective business decisions.

Unit No	Content	Hrs.
1	Linear Programming Problem(LPP) : 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
2	Solution of LPP: Solution of LPP by graphical method, simplex method,Duality Theory-Writing dual of primal problem	7
3	Transportation Problem: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
4	Optimum solution of TP-MODI Method of obtaining an optimal solution of TP. Assignment problem:Statement of AP, balanced and unbalanced AP, relation with TP, Optimal solution of AP by using Hungarian method.	8

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Explicate the Operations Research, Linear Programming Problem and explain the methods of solving Solution of LPP using Graphical Method, Simplex method.
2	Solve Transportation and Assignment problems.
3	Develop linear programming (LP) models for shortest path, assignment problem and transportation problems.
4	Discern the mathematical tools that are needed to solve optimization problems.

Suggested Readings:

1. Operations Research -H.A.Taha-Prentice-Hall, Inc.
2. Operations Research-Kantiswarup Gupta-sultan chand & sons

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Linear Electronics-II

Course Code: DSC-4B Theory-I **Total Hours 30** **Course Credits 2**

Course Objectives: This course provides understanding of the basic Oscillators and Amplifiers.It builds background for design of electronics embedded systems. Students can be able to participate in the design , development of various electronics systems.

Unit No	Content	Hrs.
1	Multivibrators ,Oscillator and Amplifiers 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
2	Audio, Video and IO Seven Segment Display, Bar Chart, Dot Matrix Display, LCD, Opt coupler, Speaker, MIC, Buzzer	7
3	Sensors and Transducers 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
4	Motors DC Motor, Brushless Motor, Stepper Motor, Servomotor, AC Motor (working and application only)	7

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Describe the types of Multivibrator,Oscillators
2	Illustrate operational amplifiers characteristics and its various applications
3	Identify and describe various Audio and video devices and applications
4	Describe various sensors working and uses of it in real world
5	Write transducer basic working phenomenon
6	Classify different brush and brushless motors

Suggested Readings:

1. Marketing Research – G.C. Beri – Tata McGraw Hill.
2. Research Methodology – C.R. Kothari – New Age International Publication.
3. Marketing Research - Nargundkar- Tata McGraw Hill.

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I) (W.E.F. JUNE 2020)

Course Title: Digital Electronics and Microprocessor

Course Code: DSC-4B Theory-II **Total Hours 30** **Course Credits 2**

Course Objectives: The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor Assembly language programming will be studied as well as the design of various types of digital and analog interfaces

Unit No	Content	Hrs.
1	Programmable Logic: Basic building and types of Simple Programmable Logic Devices (SPLDs) - PLDs,PLA,PAL , Complex Programmable Logic Devices (CPLDs)-Basic building blocks,Functionality	7
2	Data Converters: 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
3	Semiconductor Memories 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
4	Fundamentals of Microprocessor 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

Co No	**Expected Course Outcomes** *On completion of this course, the students will be able to:*
1	Describe basic building of PLD devices
2	Explain the principles of analog-to-digital (AD) - and digital-to-analog (DA) conversion
3	Classify different memory devices in context to speed,Storage capacity and working principle
4	Explain Internal blocks and architectures of microprocessors
5	Use various instruction of 8085 in ALP programming
6	Write Data transfer,Arithmetics and Logical ALP programming

Suggested Readings:

1. Research Methodology – C.R. Kothari – New Age International Publication.
2. Marketing Research - Nargundkar- Tata McGraw Hill.

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SYLLABUS FOR B.Sc ECS FIRST YEAR (SEMESTER – I & II)(W.E.F. JUNE 2020)

Practical list

DSC-1A & DSC-1B Practical-I	
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.

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DSC-2A & DSC-2B Practical-I	
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.

DSC-3A & DSC-3B Practical-I	
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.

DSC-4A & DSC-4B Practical-I	
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 multivibbrator
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 using8085 µp
24	Arithmetic operations using 8085 µp
25	Data transfer operations using 8085 µp