Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited-2022
'B++' Grade (CGPA 2.96)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Bachelor of Computer Application

Name of the Course: B.C.A. Part-I (Sem.– I & II)

(Syllabus to be implemented from June 2022)

Preamble :

Bachelor of Computer Applications (BCA) is a three year under Graduate Programme spread over six semesters. The Course is designed to bridge the gap between IT industries and Academic institutes by incorporating the latest development, into the Curriculum and to give students a complete understanding within a structured framework. The Course helps the students to build-up a successful Career in Computer Science and for pursuing higher studies in Computer Science.

Objective of the Programme :

1. Demonstrate the ability to adapt to technological changes and innovations in the discipline.
2. Develop computer programs using functional programming and object-oriented programming paradigms..
3. To train students in professional skills related to Software Industry.
4. To prepare the necessary knowledge base for research and development in Computer Science.
5. To help students build-up a successful career in Computer Science and to produce entrepreneurs who can innovate and develop software products. Programme Outcome: BCA programme has been designed to prepare graduates for attaining the following specific outcomes:
6. An ability to apply knowledge of mathematics, statistics and computer science in practice.
7. An ability to enhance not only a comprehensive understanding of the theory but its application too in diverse fields.
8. The program prepares the young professional for a range of computer applications, computer organization, techniques of Computer Networking, Software Engineering, Web Development, Database management and Advance Java.
9. An ability to design a computing system to meet desired needs within realistic constraints such as safety, security and applicability in multidisciplinary teams with a positive attitude.
10. In order to enhance the programming skills of the young IT professionals, the program has introduced the concept of project development in each language/technology learned during the curriculum.

Eligibility for BCA (Bachelor of Computer Application)

        A candidate for being eligible for admission to the Degree Course in Computer. The candidate passing the Higher Secondary Examination Conducted by the Maharashtra State Board of Higher Secondary Education with Arts/Commerce/Science stream or its equivalent or any Diploma of not less than two years.

Programme Outcomes (PO) :

These outcomes describe what students are expected to know and can do by the time of graduation. They relate to the skills, knowledge, and behaviours that students acquire in their graduation through the program

Programme Outcomes for BCA (Bachelor of Computer Application):

The BCA (Bachelor of Computer Application) programme enables students to attain, by the time of graduation:

PO1: Design and develop software based solutions for real life problems, serving effectively to the requirements of computer field and Society.

PO2: Attain sufficient knowledge related to computer domains, possesses technical, soft and hard skills and apply them effectively in team work.

PO3: Ability to link knowledge of Computer Science with other two chosen auxiliary disciplines of study.

PO4: Display ethical code of conduct in the usage of Internet and Cyber systems.

PO5: Ability to pursue higher studies of specialization and to take up technical employment.

PO6: Identify, formulate and analyze complex real-life problems in order to arrive at computationally viable conclusions using fundamentals of mathematics, computer sciences, management and relevant domain disciplines.

PO7: Ability to operate, manage, deploy, configure computer network, hardware, and software operation of an organization.

PO8: Apply standard Software Engineering practices and strategies in real-time software project development.

PO9: Design and develop computer programs/computer -based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics.

PO10: Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems

PO11: The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.

PO12: The ability to work independently on a substantial software project and as an effective team member.

Faculty of Science and Technology
Choice Based Credit System (CBCS),(w.e.f. 2022-23) Revised Structure for BCA-I (Sem-I & II)

Subject/ Core Course	Name and Type of the Paper			Hrs./week			Total Marks Per Paper	UA	CA	Cred-its
	Type	Name	Paper / Practical No	L	T	P				
BCA-I (Sem-I)										
Ability Enhancement Compulsory Course (AECC)		English Paper I Part-A (Communication Skill)		4.0			50	40	10	2.0
*Core Courses .	DSC 1A	Fundamentals of Computer	Paper- I	2.5	--	--	50	40	10	4.0
		Office Automation	Paper-II	2.5	--	--	50	40	10	
	DSC 2A	Programming and Problem Solving using 'C' – I	Paper- I	2.5	--	--	50	40	10	4.0
		Web Program-ming-I	Paper-II	2.5	--	--	50	40	10	
	**DSC 3A /GE-1A	Basics of Mathe-matics	Paper- I	2.5	--	--	50	40	10	4.0
		Descriptive Statis-tics	Paper-II	2.5	--	--	50	40	10	
	***DSC 4A /GE-2A	Fundamentals of Electronics	Paper- I	2.5	--	--	50	40	10	4.0
		Linear Electronics	Paper-II	2.5	--	--	50	40	10	
	Total			**24**	**--**	**--**	**450**	**360**	**90**	**18**
BCA-I (Sem-II)										
Ability Enhancement Compulsory Course (AECC)		English Paper I Part-B (Communi-cation Skill)		4.0			50	40	10	2.0
*Core Courses	DSC 1B	Introduction to Py-thon Programming	Paper-III	2.5	--	--	50	40	10	4.0
		Operating System	Paper-IV	2.5	--	--	50	40	10	
	DSC 2B	Programming and Problem Solving using 'C' – II	Paper-III	2.5	--	--	50	40	10	4.0
		Web Program-ming-II	Paper-IV	2.5	--	--	50	40	10	
	**DSC 3B/GE-1B	Graph Theory	Paper-III	2.5	--	--	50	40	10	4.0
		Probability Thoery	Paper-IV	2.5	--	--	50	40	10	
	***DSC 4B/GE-	Digital Fundamen-tals of Computer	Paper-III	2.5	--	--	50	40	10	

2B	Introduction of Microprocessor and Interfacing	Paper-IV	2.5	--	--	50	40	10		4.0
	Democracy, Elections and Good Governance		3			50	40	10		NC
Total (Theory)			**24**	--	--	**450**	**360**	**90**		**18**
Core Practical	DSC 1 A & 1B	Practical I		--	--	4	100	80	20	4.0
	DSC 2 A & 2B	Practical II		--	--	4	100	80	20	4.0
	DSC 3A &3B / GE-1A&1B	Practical III		--	--	4	100	80	20	4.0
	DSC 4A & 4B / GE-2A &2B	Practical IV		--	--	4	100	80	20	4.0
Total (Pract.)					16	400	320	80		16
Grand Total			48		16	1300	1040	260		52

B.C.A. – I (Semester-I)

Course Title:-Fundamentals of Computer

Paper Type: DSC 1A   **Paper Code: I**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5

University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Objectives:
1. Familiarise the concepts of operating systems, programming languages, peripheral devices, networking, multimedia and internet.
2. It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
3. The focus of the subject is on introducing skills relating to IT basics, computer applications, etc.

Course Outcomes: At the end of this course, the student should be able to:
1. To understand basic concepts and terminology of information technology.
2. To a basic understanding of personal computers and their operations.
3. To understand various input and output devices.
4. To understand internet concepts.

Unit No.	Description	No. of Lectures
I	**Introduction to Computer**: Computer Characteristics, Concept of Hardware, Software, Evolution of computer and Generations, Types of Computer – Analog and Digital computers, Hybrid Computers, General Purpose and Special Purpose Computer, Limitations of Computer, Applications of Computer in Various Fields. **Structure and Working of Computer:** Structure and Working of Computer: Functional Block Diagram of Computer. CPU, ALU, Memory Unit, Bus Structure of Digital Computer – Address, Data and Control Bus. **Input/output Devices: Input Device:** Keyboard, Voice Recognition Device, Digitizers, Point and draw devices- mouse, joystick, track ball, light pen, Data scanning devices:- image scanner, OCR, OMR, MICR, Bar code reader, card reader **Output Devices:** Monitor, Printer: - laser printer, dot-matrix printer, ink jet printer, Daisywheel Laser, Line (Chain and Drum), Plotters. **Computer Memory:** Memory Concept, Memory Cell, Memory Organization, Semi-	18

	conductor Memory – RAM, ROM, PROM, EPROM, Secondary Storage Devices – Magnetic Tape, Magnetic Disk (Floppy Disk and Hard Disk.), Compact Disk.	
II	**Computer Language and Software**: Algorithm, Flowcharts, Machine Language, Assembly Language, High Level Language, Assembler, Compiler, Interpreter. Characteristics of Good Language. Software – System and Application Software **Computer Communication and Networks:** Basic of Computer Networks (LAN, MAN, WAN), Internet-Concept of Internet, Applications of Internet, Connecting to the Internet, Troubleshooting, World Wide Web (WWW), Web Browsing Software, Search Engines- Popular Search Engines / Search for content, Accessing Web Browser, Downloading Web Pages, Printing Web Pages, Understanding URL, Surfing the web. **Basics of E-mail**- What is an Electronic Mail, Email Addressing, Using E-mails and Opening Email Account, Mailbox: Inbox and Outbox, Creating and Sending a new E-mail, Replying to an E-mail Message, Forwarding an E-mail message, sorting and searching emails, Document collaboration, Instant Messaging and Collaboration, Using Instant messaging, instant messaging providers Netiquettes	**12**

Books Recommended:
1) Computer Fundamental –P.K. Sinha
2) Computer Fundamental – V. Rajaraman

3) Computer Today – Donaid N. Sanders.

B.C.A. – I (Semester-I)

Course Title:-Office Automation

Paper Type: DSC 1A   **Paper Code: II**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objectives:
1. To provide an in-depth training in use of office automation, internet and internet tools. The course alsohelps the candidates to get acquainted with IT.
2. To help the students to understand how to format, edit, and print text documents and prepare for
3. desktop publishing.
4. Students will be able to create various documents newsletters, brochures, making document using photographs, charts, presentation, documents, drawings and other graphic images.
5. To work with the worksheet and presentation software.

Course Outcomes:
At the end of this course, the student should be able to:
1. Integrate both graphs and tables created in Microsoft Excel into a laboratory report in Microsoft Word.
2. Generate equations, sample calculations, and basic diagrams in Microsoft Word.
3. Input experimental data into Microsoft Excel.
4. Perform calculations in Microsoft Excel using both manually inputting formulas and built-in Functions.
5. Generate simple and effective tables and graphs to describe experimental data in Microsoft Excel.
6. Properly format and organize a formal laboratory report in Microsoft Word.

Unit No.	Description	No. of Lectures
I	**Introduction to Computer:** Applications of Computer, Advantages of Computer, Characteristics of Computer, Hardware & Software. **Windows:** Desktop icons and their functions: My computer, My documents, Network neighborhood, Recycle Bin, Quick launch tool bar, System tray, Start menu, Task bar, Dialog Boxes: List Box, Spin Control Box, Slide, Drop-down list, Radio button, Check box, Text box, Task Bar - System Tray - Quick launch tool bar - Start button - Parts of Windows -Title bar, Menu bar	12

, Scroll bar, Status bar, Maximize, Minimize, close and Resize & Moving a Window, Keyboard Accelerators: Key board short keys or hotkeys.

MS Word:

Working with Documents -Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help.

Formatting Documents:

Setting Font styles, Font selection- style, size, colouretc, Type face - Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering.

Setting Page style:

Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes – Shortcut Keys; Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page.

Creating Tables:

Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula.

Drawing: Inserting Clip Arts, Pictures/Files etc.

Tools:

Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature. Printing Documents – Shortcut keys.

| II | **MS Excel:**
Spread Sheet & its Applications, Opening Spreadsheet, Menus - main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets- opening, Saving files, setting Margins, Converting files to different formats (importing, exporting, sending files to others), Spread sheet addressing - Rows, Columns & Cells, Referring Cells & Selecting Cells – Shortcut Keys.
Entering & Deleting Data:
Entering data, Cut, Copy, Paste, Undo, Redo, Filling Continuous rows, columns, Highlighting values, Find, Search & re- | 18 |

place,Inserting Data, Insert Cells, Column, rows & sheets, Symbols, Data from external files, Frames, Clipart, Pictures, Files etc, Inserting Functions, Manual breaks.

Setting Formula:

Finding total in a column or row, Mathematical operations (Addition, Subtraction, Multiplication, Division, Exponentiation), using other Formulae.

Formatting Spreadsheets:

Labelling columns & rows, Formatting- Cell, row, column & Sheet, Category - Alignment, Font, Border & Shading, Hiding/ Locking Cells, Anchoring objects, Formatting layout for Graphics, Clipart etc., Worksheet Row & Column Headers, Sheet Name, Row height & Column width, Visibility - Row, Column, Sheet, Security, Sheet Formatting & style, Sheet background, Colour etc, Borders & Shading – Shortcut keys.

Working with sheets:

Sorting, Filtering, Validation, Consolidation, and Subtotal.

Creating Charts:

Drawing. Printing. Using Tools – Error checking, Formula Auditing, Creating & Using Templates, Pivot Tables, Tracking Changes, Security, Customization.

MS Power point:

Presentation – Opening new presentation, Different presentation templates, setting backgrounds, selecting presentation layouts.

Creating a presentation:

Setting Presentation style, Adding text to the Presentation.

Formatting a 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, Drawing Pictures using draw.

Adding Effects to the Presentation:

Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer.

MS Access:

Introduction, Planning a Database, Starting Access, Access Screen, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports, Printing & Print Preview – Importing data from other databases viz. MS Excel etc.

Books Recommended:

1. Information Technology in Business: Principles, Practices, and Opportunities by James A Senn, Prentice Hall.
2. Technology and Procedures for Administrative Professionals by Patsy Fulton-Calkins, Thomson Learning.
3. Computer Fundamental MS Office – Including Internet & Web Technology: Anupama Jain(Author), AvneetMehra
4. The Complete Reference: Virginia Andersen, McGraw Hill
5. MS Office 2007 in a Nutshell: S. Saxena, Vikas Publications
6. MS-Office 2007 Training Guide: S. Jain, BPB Publications
7. Learning Computer Fundamentals, MS Office and Internet & Web Technology: D. Mai dasani. Reading, Vols. 1 and 2. Macmillan, 1975, Bhasker, W. W. S & Prabhu, N. S

B.C.A. – I (Semester-I)

Course Title:-Programming and Problem Solving using 'C'-I

Paper Type: DSC 2A   **Paper Code: I**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objectives:
1) To understand the various steps in Program development.
2) To understand the basic concepts in C Programming Language.
3) To learn how to write modular and readable C Programs
4) To learn to write programs (using structured programming approach) in 'C' to solve problems
5) To build efficient programs in "C" language essential for future programming and software engineering courses.

Course Outcomes:
Students will be able to:
1) Able to understand the basic concepts of C programming language.
2) Enhance skill on problem solving by constructing algorithms
3) Students will be able to comprehend the general structure of C program, concepts of variable, datatype, operator and be able to create a C program to demonstrates these concepts.
4) Able to design and develop various programming problems using C programming concepts.
5) Understand and use various constructs of the programming language such as conditionals, iteration.
6) Demonstrate the use of strings and string handling functions
7) Apply skill of identifying appropriate programming constructs for problem solving

Unit No.	Description	No. of Lectures
I	**Programming Methodology:** Definition of Problem , Problem solving steps , Introduction to programming planning tools , Need of programming planning tools, Definition of Logic , Types of logic- 1) Sequence logic 2) Selection logic 3) Iteration logic • **Algorithm**- Definition,Characteristics or features of algorithm, Examples of algorithm to solve problem. •**Flowchart**- Definition, characteristics or features of flowchart , symbols used in flowchart , Examples that converts algorithms to flowchart • **Pseudo Code**- Definition, characteristics or features of pseudo code, Examples of pseudo code	12

	Introduction to 'C': History or evolution of 'C' language, Features or characteristics of 'C' language. ,Structure of 'C' program, Compilation & execution of program. **C' Fundamentals**: 'C' tokens- Keywords , Identifier, Special symbols ('C' character sets), Variables, Constants, Data types- Primitive, Derived, User defined, Operators- Arithmetic, logical, assignment, relational, bitwise, conditional, increment, decrement, sizeof, comma operator etc., Type casting or type conversion , Use of 'typedef' and 'enum' , Precedence and associatively of operator, Header files and its use. **Data input and output operations**: Introduction to input and output operations, Introduction to header files, stdio.h header file functions - printf( ), scanf( ), getchar( ), putchar( ), Different format specifier with their use, Different back slash (escape sequence) character constants with their use	
II	**Control Statements:** Introduction to control statement, Types of control statements- Selective or Decision making -Different forms of if statement , switch statement , Conditional (ternary) operator **Iterative or looping statement** -While loop , do-while loop , for loop **Unconditional branching (jump) Statement** - break statement, continue statement, goto statement **Arrays**: Introduction & definition of an array, Types of an array -One dimensional array, Two dimensional array, Multi-dimensional array , Declaration & initialization of an array, Memory allocation of an array, Character array (string)-Declaration, Operation on string, Inbuilt String functions.	**18**

Books Recommended :

1) Programming in ANSII-C – E. Balgurusamy
2) The C programming Language - Ritchie and Kernighan
3) Let Us C - Y.C. Kanetkar.
4) A structure Programming Approach using 'C'- Behrouz A. Forouzan, RichardF. Gilberg

B.C.A. – I (Semester-I)

Course Title:-Web Programming-I

Paper Type: DSC 2A   **Paper Code: II**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5

University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objectives:
1. Understand best technologies for solving web client problems
2. Analyze and design real time web applications
3. Develop web based application using suitable client side web technologies

Course Outcomes:
The student will be able to:
1) Analyze a web page and identify its elements and attributes.
2) Create web pages using HTML and Cascading Style Sheets.
3) Build static web pages using HTML,CSS (Client side programming).
4) Create XML documents and Schemas.

Unit No.	Description	No. of Lectures
I	**Overview of HTML & HTML5:** Introduction to Web technology, Introduction to Internet, Requirement for Internet,History of web technology, Introduction to HTML, Overview of basic HTML, Structure of HTML, Creating and opening HTML file, Singular and paired tags, Text formLists, Image, Image Map, Table, FramForm, get and post method, input tag.	12
II	**HTML5-** Introduction to HTML5, Need of HTML5, DOCTYPE Element Tags-Section, Article, aside, header, foot figure etc., Events in HTML5, Input tag in HTML5- (Type, Auto focus, placeholder, required etc. attributes.), Graphics in HTML5, Media tags in HTML5 **CSS -** Introduction to CSS, Use of CSS, Types of CSS, Selectors, Properties, Values., CSS Properties- Background, Text, Fonts, Link, List, Table, Box Model, Border, Margin, Padding, Display, Positioning, Floating, Opacity, Media type, Backgrounds and Borders Image, Values and Replaced Content, Text Effects, 2D/3D Transformations, Animations, Multiple Column Layout, User Interface, CSS interact with JavaScript.	18

Books Recommended:

1) HTML5 Black Book- Kogent Learning Solutions IncDreamtech.
2) Beginning JavaScript and CSS Development with jQuery- Richard York.
3) Beginning HTML and CSS-Rob Larsen.
4) HTML_&_CSS_The_Complete_Reference-Thomas A. Powell. (Fifth Edition).

5) W3schools.com

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B.C.A. – I (Semester-I)

Course Title:-Basics of Mathematics

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Paper Type: DSC 3A | **Paper Code: I**

Credits: Theory – (2) | **Practical – (2)**

Total Lectures: 30 Hrs. | **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks | **Internal Evaluation:** 10 Marks

Course Objectives:

The purpose of the course is to familiarize the prospective learners with mathematical structure that are fundamentally discrete. This course introduces set theory, relation and and different counting principles. These concepts are useful to study or describe object or problems in computer

Course Outcomes:

   On successful completion, of course, learner/student will be able to:

1. To provide overview of theory of discrete objects, starting with relations and
    partially ordered sets.
2. To describe the fundamental counting principle and to determine the number of
    possible combinations for a given situation using the fundamental counting
    principle
3. Understand the basic principles of sets and operations in sets.
4. Prove basic set equalities.
6. Demonstrate an understanding of relations able to determine their properties.

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Unit No.	Description	No. of Lectures
I	**Unit-I : Basics of Matrices and Elementary logic** **Basics of Matrices:** Definition of matrix, order, types of matrices: square matrix, rectangular matrix, diagonal matrix, scalar matrix, upper triangular matrix, lower triangular matrix, symmetric matrix, skew symmetric matrix, identity matrix, row matrix, column matrix, transpose of a matrix, inverse of a matrix. Algebra of matrices: addition, subtraction, scalar multiplication, matrix multiplication. **Elementary Logic:** Prepositional Calculus: Proposition- Simple statement, Compound statement, Logical connectives, Disjunction, Conjunction , Negation , Implication, Double implication, Converse, inverse and contra positive of conditional statement, truth tables, tautology, Contradiction &	12

	neither, ommutative laws, associative laws, distributive laws, DeMorgan's laws, logical equivalence.	
II	**Sets, Relations and Counting Principles** **Set:** Definition: Set, Subset, power set, disjoint sets , Operations on sets : Union, Intersection ,Complement , Difference , Symmetric difference, Algebraic properties of set operations: Commutative laws , Distributive laws, Associative laws , DeMorgan's laws , Cardinality of set. **Relation** : Definition of Cartesian product , relation, Types of relation: void, universal, identity, reflexive, symmetric, transitive, equivalence , anti-symmetric, partial ordering, asymmetric, Matrix representation of relation, Graphical representation (digraph) of relation, Indegree and out-degree of a vertex, Transitive closure: Warshall's algorithm **Counting principles:** Cardinality of a set, Pigeonhole principle, Addition principle, Multiplication principle, Inclusive-exclusive principles for two sets & three sets, Problems	**18**

Books Recommended:
1. Discrete mathematics & its applications- K. Rosen
2. Computer Oriented Numerical Methods. – Rajaraman
3. Elements of Discrete Mathematics- C.L.Liu
4. Discrete Mathematical structure for Computer Science-Alan Doerr and K.Levessuer
5. Introductory Methods of Numerical Analysis-S.S. Sastry (Prentice Hall)
6. Matrices by Shantinarayan, S. Chand & Co. New Delhi

B.C.A. – I (Semester-I)

Course Title:-Descriptive Statistics

Paper Type: DSC 3A   **Paper Code: II**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objectives:
The main objective of this course is to acquaint students with some basic concepts of Statistics. They will be introduced to some elementary statistical methods of analysis.

Course Outcomes:
   On successful completion, of course, student will be able:
1. To prepare frequency distribution and represent it by graphically with the help of tables.
2. To compute various measures of central tendency, dispersion and to interpret them.
3. To compute correlation coefficient and interpret its value.
4. To estimate or predict through linear regression method.

Unit No.	Description	No. of Lectures
I	**Population and Sample**-Concept of Statistical Population and Sample with illustration, Methods of sampling - SRSWR, SRSWOR, Stratified (description only) **Data condensation and Graphical methods:** Raw data, Attribute, Variables, Discrete and Continuous Variable, General principles of classification of raw data, Construction of frequency distribution, Cumulative frequency distribution, Graphical representation of frequency distribution - Histogram, Ogives, Numerical problems. **Measures of Central Tendency** –Concepts, Objects of Central Tendency, Criteria for good Measures of Central Tendency, Arithmatic Mean (A.M.) – definition, formula for computation for ungrouped & grouped data, combined A.M., effect of change of origin & scale, merits & demerits, Median- definition, formula for computation for ungrouped & grouped data, graphical methods, merits & demerits, Mode- definition, formula for computation for ungrouped & grouped data, graphical methods, merits & demerits, Empirical relation between mean ,mode & median, Numerical Problems. **Measures of Dispersion**: Concept of dispersion, Absolute &	18

	Relative measures of dispersion, Range- definition, formula for computation for ungrouped & grouped data, coefficient of range, merits & demerits, Variance & Standard Deviation (S.D.) - definition, formula for computation for ungrouped & grouped data, Coefficient of Variation (C.V.) , effect of change of origin & scale, merits & demerits, Numerical problems.	
II	**Correlation** - Bivariate data, scattered diagram. Concept of correlation, types of correlation, cause & effect relation. Karl Pearson's coefficient of correlation (r), limits of r ($-1 \le r \le 1$) Interpretation of r, basic assumptions on which r is based, Numerical problems. **Regression for ungrouped data**-Concept of regression, Lines of regression, Derivation of lines of regression by least square principle. Properties of regression coefficients, Numerical problems.	**12**

Books Recommended:

1. Fundamentals of Mathematical Statistics- Kapoor& Gupta.
2. Modern elementary Statistics – J.E.Freund
3. Statistical Methods – J.Medhi.
4. Fundamentals of Statistics-S.C.Gupta.

B.C.A. – I (Semester-I)
Course Title:-Fundamentals of Electronics

Paper Type: DSC 4A **Paper Code: I**

Credits: Theory – (2) **Practical – (2)**

Total Lectures: 30 Hrs. **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks **Internal Evaluation:** 10 Marks

Course Objective:

The subject aims to provide the student with:
1. An understanding of Advanced Electronics abstractions on which analysis and Design of Integrated Circuits(IC's) and Logic Families.
2. The capability to use abstractions to analyse display devices and sensors. Designing Of PCB technologies in electronics devices.

Course Outcomes:

Upon successful completion of this course, students will be able to-
1. Learn how to develop the Integrated circuits (IC) in electronics systems. E.g. Computer system, Microprocessor, Microcontroller, Mobile etc.
2. Learn how to Manufacturing Resistors, Capacitors, Diode and Transistor in IC.
3. An understanding of different Display devices, Sensors and PCB technologies used In Computer System.

Unit No.	Description	No. of Lectures
I	**Integrated Circuits** Introduction to IC, Linear or Digital IC's (only Define), Fabrication process of IC (Explain in detail with diagram). **Steps of IC fabrication process**: 1) Substrate Preparation (Wafer production) 2) Epitaxial Growth (N-Type and P- Type Layer) 3) Insulation Layer (Sio2) 4) Photolithography: i) Masking and Etching 5) Diffusion (Doping or Ion Implantation) 6) Isolation Process 7) Metallization **Monolithic IC's**: Component Fabrication: Transistor, Diode, Resistor and Capacitor. Applications of IC's	15
II	**Display Devices and PCB Technology** **Display Devices**: LED (Construction, working and Application).	

Seven segment LED Display (Construction, working and Application). LCD Display (Construction, working and Application). LED Display (Construction, working and Application). **Introduction to PCB Technology:** Single layer and Multilayer PCB Technology. Surface Mounting Devices (SMD), Surface Mounting Technology (SMT), Advantages and Applications of SMT and SMD.	**15**

Reference books:

1. B.L.Theraja**, Basic *Solid State Electronic*. S.Chand & Company Ltd.
2. V.K. Mehta**, Principles *of Electronic*s**, S.Chand & Company Ltd.

Course Title:-Linear Electronics

Paper Type: DSC 4A   **Paper Code: II**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objective:
The subject aims to provide the student with:
1. An understanding of basic Electronics abstractions on which analysis and Design of electrical and electronic circuits and systems are based, including Digital circuit.
2. The capability to use abstractions to analyse and design simple electronic Circuits.

Course Outcomes:
Upon successful completion of this course, students will be able to-
1. Learn how to develop and employ circuit models for elementary electronic Components, e.g., resistors, inductors, capacitors, diodes and transistors.
2. Gain an intuitive understanding of the role of power flow and energy storage In electronic circuits.
3. Learn how to develop different power supplies in computer system.

Unit No.	Description	No. of Lectures
I	**Discrete Components In Computer System:** **Resistors:** Classification of Resistor (Fixed and Variable) Fixed Resistor: Carbon composition, Construction, Application. Variable Resistor: Potentiometer, Construction, Working and Application, Colour coding of Resistor with Examples **Capacitors:** Classification of capacitor (Electrolyte and Non Electrolyte), Electrolyte: construction of electrolyte, Non-electrolyte (mica, ceramic): construction of Non electrolyte, Applications of both electrolyte and Non-electrolyte capacitors. **Variable Capacitor:** Gang capacitor, Application of variable capacitors **Inductors:** types of inductors (iron core and air core), its applications, **Transformers:** Types of transformers (step up and step down), Construction of step down transformer and its applications.	15

II	**Semiconductor Devices and DC Power Supplies** Classification of Materials on the basis of Energy Band Diagram. Introduction to Semiconductor: P type semiconductor (Construction), N type Semiconductor (Construction), Formation of P-N Junction Diodes, Working of P-N Junction Diode, Applications of P-N junction Diodes. Introduction to Bipolar Junction Transistors (BJT): Symbol, types, construction and Working of PNP and NPN transistor, applications of BJT **DC Power Supplies:** Introduction to power supplies, Rectifier: Definition, types of rectifier (Half, Full,), Construction and Working of rectifiers Regulated power supplies (by using 3-pin positive (78xx) and negative voltage (79xx) regulator): Block diagram and working of regulated power supplies, applications of regulated power supplies. **SMPS:** block diagram, working and applications.	15

Reference books:

1. Principle of Electronics- V.K.Mehta (new e/d)
2. Electronics Principle- Malvino
3. Basic Solid State Electronic- B.L.Theraja
4. Principle of Electronics-P.C.Narayan Rao (Vol.I, II, III) New Age International
5. Basic Electronics and Linear Circuits: N.N. Bhargava, D.C. Kulshreshtha, S.C. Gupta Tata McGraw Hill Publishing Company
6. Electronic Devices and circuits: Boy stead, Tata McGraw Hill

Course Title:-Introduction to Python Programming

Paper Type: DSC 1B	**Paper Code: III**
Credits: Theory – (2)	**Practical – (2)**

Total Lectures: 30 Hrs. **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks **Internal Evaluation:** 10 Marks

Course Objective:
1. To learn the fundamentals of python Programming
2. To learn different data structures used in Python
3. To learn different control statements used in logic development.
4. To learn the various operations on the array, list, tuple, string, set, and dictionary.

Course Outcomes: Upon successful completion of this course, students will be able to-
1. Understand the features or characteristics of Python.
2. Understand the concept of Python Virtual Machine, Python Data types, Command Line Argument, Operators.
3. Explore Integrated Development Environment (IDE).
4. Do programs using conditional control statements and also use the concept of Looping for doing programs.
5. Describe the concept of strings, Collection Lists, Tuples and Dictionaries.

Unit No.	Description	No. of Lectures
I	**Introduction:** Features of python, steps for execution of python program, python virtual machine, memory management, garbage collection, Installation of python software, setting the path to operating system environment, writing the first python program, executing a python program. **Datatypes in python**: Datatypes, type conversion- implicit and explicit, comments, literals, constants, Identifiers, naming conventions, operators, operator precedence and associativity, input and output statements, command-line arguments. **Control Statements:** if statement, if..else statement, if..elif..else statement, while loop, for loop, else suite, infinite loop, nested loops, word indentation, break statement, continue statement, pass statement, assert statement, return statement.	12

II	**Arrays in Python:** Concept of array, advantages of array, creating an array, importing array module, indexing and slicing on arrays, methods of array module, types of arrays. **String, List, Tuple, Set and Dictionary:** Creating string, manipulating different operations on string, creating list, manipulating different operations on list, list comprehensions, creating tuple, manipulating different operations on tuple, creating set, manipulating different operations on set, creating dictionary, manipulating different operations on dictionary,	**18**

Reference Books:

1. Python: The Complete Reference by Martin C. Brown.
2. Core Python Programming, Dreamtech publications, by R. Nageswara Rao.
3. Python Programming, A modular approach, First Edition, Pearson, by Taneja Sheetal
4. Learning with Python, Dreamtech publications, by Allen Downey
5. Python Programming for the Absolute Beginner by Michael Dawson-Cengage Learning.

B.C.A. – I (Semester-II)

Course Title:-Operating System

Paper Type: DSC 1B   **Paper Code: IV**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objectives:

1. This course has two components: a theory component to teach you the concepts and principles that underlie modern operating systems, and a practice component to relate theoretical principles with operating system implementation.
2. In the theory component, you will learn about processes and processor management, concurrency and synchronization etc.

Course Outcomes:

1. Understand fundamental operating system abstractions such as processes, threads, files, semaphores, IPC abstractions, shared memory regions, etc.
2. To provide a sound understanding of the Computer operating system, its structures, and its functioning.
3. Analyze Process scheduling algorithms.
4. To understand what a process is and how processes are synchronized and scheduled.

Unit No.	Description	No. of Lectures
I	**Introduction:** Definition of Operating System, Types of Operating System-Batch, Multiprogramming, Time Sharing, Real-Time, Distributed, Parallel, Structure of O.S., System Components, Services provided by O.S., Monolithic and Layered Systems, System design and implementation, System Generalization and virtual machine. **Process Management:** Definitions of Process, Process States, Process State Transition, Process Control Block, Operations on Processes, Cooperating Processes, System Calls, Inter-Process Communication **Threads:** Definitions of Threads, Types Of Thread, Benefits of Multithread	15
II	**Process Scheduling:** Basic Concept, Type of Scheduling, Scheduling Criteria, Scheduling Algorithm(FCFS, SJF, Round Robin, Priority Scheduling, Multilevel Queue Scheduling, Multilevel- feedback Queue Scheduling.), Numerical Examples on Scheduling.	15

Process Synchronization: The Producer Consumer Problem, Race Conditions, Critical Section Problem, Semaphores, and Classical Problems of Synchronization: Reader-Writer Problem, Dinning Philosopher Problem.	

Books Recommended:

1. System programming and O.S.By D.M. Dhamdhere.
2. Modern O.S. By Andrews Tanenbaum.

3. Operating System Concepts BySiberchatz and calvin.

B.C.A. – I (Semester-II)

Course Title:-Programming and Problem Solving using 'C'-II

Paper Type: DSC 2B   **Paper Code: III**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objective:

Students will be able to develop logics which will help them to create programs, applications in 'C' language. Also by learning the basic programming constructs they can easily switch over to any other language in future.

Course Outcomes:

1. Able to Implement advance C programming concepts like function, pointer, structure and union etc.
2. Understand the dynamics of memory by the use of pointers.
3. Able to understand the file handling using C Programming language.
4. To understand the concept of macros and preprocessor.

Unit No.	Description	No. of Lectures
I	**Functions:** Introduction & definition of function, Need or use of function, Types of Functions-Inbuilt/Predefined/Library functions, User defined function, Steps to add or include user defined function in program-Function declaration (Prototyping) ,Function calling , Function definition (Function Implementation) • Types of Function - Function with argument without return value, Function with argument with return value , Function without argument with return value, Function without argument without return value • Variables-Definition, characteristics & importance of local & global variable • Recursion. •Storage Classes -Introduction, definition of storage Classes, Explanation and use of storage classes- auto, extern, static, register **Pointers**: Definition and declaration of pointer, Pointer initialization, Pointer and function , Pointer and array, Pointer of pointer, Call by value and Call by reference , Dynamic memory allocation.	18

II	**Structures and Union:** Definition and declaration, Array of structures, Passing structure to function, Pointer to structure, Nested structure, self referential structure, Size of and type def. **File Handling**: Introduction, Standard input- get char(), getch(), getche(), Standard output- put char(), putch(), putche(), Formatted input- scanf(), sscanf(), fsclose(), File modes, Text and binary mode. **Macros and Preprocessing**:Features of C pre-processor, Macro – Declaration, Expansion, File Inclusion	**12**

Books Recommended:

1) Programming in ANSII-C – E. Balgurusamy
2) The C programming Language - Ritchie and Kernighan.
3) Let Us C - Y.C. Kanetkar

B.C.A. – I (Semester-II)

Course Title:-Web Programming-II

Paper Type: DSC 2B   **Paper Code: IV**

Credits: Theory – (2)   **Practical – (2)**

Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objectives:
1. On completion of this course, a student will be familiar with client server architecture and able to develop a web application using Javascript and JQuery technologies.
2. Students will gain the skills and project-based experience needed for entry into web application and development careers.
3. Use Java script for dynamic effects and to validate form input entry
4. Analyze to Use appropriate client-side or Server-side applications

Course Outcomes:
    The student will be able to:
1. Develop programming skills by the use of java script
2. Build dynamic web pages using JavaScript (Client side programming).
3. Analyze to Use appropriate client-side applications.
4. Build interactive web applications using JQuery.
5. Develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
6. Extend this knowledge to .Net Platforms,Java Technologies,Full Stack Development

Unit No.	Description	No. of Lectures
I	**JavaScript:** Introduction to JavaScript, JavaScript Variables, Data types, Operators, Built in functions in JavaScript, Control structure in JavaScript, DOM, Math, Array, History, Navigator, Location, Windows, String, Date, Document objects, user defined function, Validation in JavaScript, Event & event handling in JavaScript.	15
II	**JQuery:** Introduction to jQuery, Need of JQuery, Adding jQuery to Your Web Pages, jQuery Syntax, jQuery Selectors, jQuery Event Methods, jQuery Effects - Hide and Show, Fading, Sliding, Animation, jQuery Callback Functions, jQuery – Chaining, jQuery – Get and Set Content and Attributes, jQuery - Add Elements, Add Several New Elements, jQuery - Remove Elements, jQuery - Get and Set CSS Classes, jQuery - css() Method, jQuery - The noConflict() Method	15

Books Recommended:

1) HTML5 Black Book- Kogent Learning Solutions IncDreamtech.
2) Beginning JavaScript and CSS Development with jQuery- Richard York.
3) Beginning HTML and CSS-Rob Larsen.
4) HTML_&_CSS_The_Complete_Reference-Thomas A. Powell. (Fifth Edition).

5) W3schools.com

B.C.A. – I (Semester-II)

Course Title:-Graph Theory

Paper Type: DSC 3B	**Paper Code: III**
Credits: Theory – (2)	**Practical – (2)**
Total Lectures: 30 Hrs.	**Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks	**Internal Evaluation:** 10 Marks

Course Objectives:
1. Cultivate clear thinking and creative problem solving.
2. To apply graph theory in solving practical problems.

Course Outcomes:

On successful completion, of course, learner/student will be able to:
1. Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving.
2. Ability to understand and apply concepts of graph theory in solving real world problems ability to reason logically.
3. Apply the concepts of graph theory in data structure of computer science.
4. Give an understanding of graphs and trees which are widely use in software.

Unit No.	Description	No. of Lectures
I	**Graph and Operations on graph:** Definition and elementary results, Types of graph: Simple graph, Multi-graph, pseudo graph, complete graph, Null graph, Regular graph, Bipartite graph, weighted graph, degree of a vertex, total degree of a graph, shaking hand lemma and elementary results, Adjacency and incidence matrix . **Operations on graphs:** Union, Intersection, Ring sum of two graphs, product of two graph, complement of a graph.	12
II	**Connected Graph and Tree** **Connected Graph:** Definition of connected graph and disconnected graph, definitions of walk, trail, path, circuit, length of a path, cut vertex, cut edge, vertex connectivity, edge connectivity. **Euler and Hamiltonian Graph:** Euler trail, Euler's circuit, Euler's graph, Hamiltonian Path, Hamiltonian Circuit, Hamiltonian Graph, travelling sales man problem, Chinese Postman problem. **Tree:** Definition of tree and elementary results, spanning tree,	18

shortest spanning tree , Kruskal's algorithm for shortest spanning tree. **Binary Tree:** Definition of a binary tree, root, internal vertex, intermediate vertex and elementary results	

Books Recommended:
1. Elements of Discrete Mathematics- C.L.Liu
2. Discrete Mathematical structure for Computer Science-Alan Doerr and K.Levessuer
3. Elements of graph theory- Bhave&Raghunathan
5. Discrete Mathematics by Schaum Series
6. Discrete Mathematical Structures by Kolman, Busby, Ross, Pearson Education Asia

B.C.A. – I (Semester-II)
Course Title:-Probability Theory

Paper Type: DSC 3B **Paper Code: IV**

Credits: Theory – (2) **Practical – (2)**

Total Lectures: 30 Hrs. **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks **Internal Evaluation:** 10 Marks

Course Objectives:
The main objective of this course is to acquaint students with some basic concepts of probability and probability distributions.

Course Outcomes :

  At the end of this course students are expected to be able.
1. To distinguish between random and non-random experiments.
2. To find the probabilities of the events.
3. To apply discrete and continuous probability distributions studied in this course in different situations.

Unit No.	Description	No. of Lectures
I	**Permutations & Combinations:** Principles of counting, Permutations of n dissimilar objects taken r objects at a time (with & without repetitions), Permutations of n objects not all similar. -Combinations of n objects taken r objects at a time, Combinations with restriction on selection (excluding or including a particular object in the group), Numerical problems. -**Probability**: Deterministic and Non-deterministic(Random) experiment – Sample space (finite, infinite, countable), -**Events**-Types of events, Probability – Classical definition, axioms of probability (Axiomatic Definition of Probability), probability of an event, Theorems of probability (with proof)- i) 0≤ P(A) ≤ 1, ii) P(A) + P(A') = 1, iii) P(Φ) = 0 iv) P(A) ≤ P(B) when A is subset of B v) Addition law of probability (Statement only). Concept & definition of conditional probability, multiplication law of probability (Statement only),Concept & definition of independence of two events, Numerical problems.	15

II	**Discrete Random Variable:** Definition of r.v., discrete r.v., Definition of probability mass function (p.m.f.), cumulative distribution function (c.d.f.) & properties of c.d.f., Definition of mathematical expectation & variance, theorems on expectation, Numerical problems. **Standard Discrete Distribution:** Binomial distribution- Definition, mean, variance (statement only), illustration of real life situations, additive property (statement only). Poisson distribution- Definition mean, variance (statement only), illustration of real life situations, additive property (Statement only), Numerical Problems. **Continuous Random Variable:** Definition-continuous r.v., probability density function(p.d.f.), cumulative distribution function (c.d.f.), statement of properties of c.d.f., Definition of mean & variance, Numerical problems. **Standard Continuous Distribution:** Uniform distributions-Definition- mean, variance (Statement only), Numerical Problems Normal Distribution-Definition, identification of parameters, nature of probability curve, standard normal variate (s.n.v.), properties of normal distribution, distribution of aX+b , aX+bY+c when X & Y are independent, Numerical Problems.	**15**

Books Recommended:

1. Fundamentals of Mathematical Statistics- Kapoor& Gupta.
2. Modern elementary Statistics – J.E.Freund
3. Statistical Methods – J.Medhi.
4. Fundamentals of Statistics-S.C.Gupta.
5. Fundamentals of applied Statistics-Gupta & Kapoor.
6. Business Statistics – S. Shah

Course Title:-Digital Fundamentals of Computer

Paper Type: DSC 4A   **Paper Code: III**

Credits: Theory – (2)   **Practical – (2)**
Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objective:
1. To learn Boolean algebra and logic gates
2. To study digital logic families and their important features
3. To develop designing and analyzing attitude about sequential circuits
4. To develop designing and analyzing attitude about combinational circuits
5. To learn 8085 Microprocessor Architecture and Assembly language Programming.

Course Outcomes:
1. Design and constructs logic as well as arithmetical circuits
2. Calculate various important parameters of Digital logic families
3. Design & analyze combinational logic circuits
4. Design & analyze sequential logic circuits
5. To Executed 8085 Microprocessor Assembly language programming.

Unit No.	Description	No. of Lectures
I	**Logic Gates and Combinational logic circuits** Introduction to logic gates, OR, AND, NOT, NAND, NOR, XOR, XNOR, Pin function of IC 7432,7408,7404,7400,7402,7486 , implementation of basic gate by universal gates , De Morgan's theorem , Applications of Logic Gates **Combinational circuit**: Introduction to combinational circuit, Half adder, full adder, Half subtractor, Multiplexer (4:1,8:1), Demultiplexer (1:4,1:8), Encoder (4:2), Decoder(2:4). Applications of Combinational Logic Circuits.	15
II	**Sequential Logic circuits** **Sequential circuits:** Concept of sequential circuits, **Flip-flops:** RS, Clocked RS, JK, Master Slave JK, D Flip-flop, T flip flop , Pin configuration of IC-7474 ,Counter-synchronous, asynchronous(3 bit up counter and Down Counter), modulus of Counter (Mod 2, Mod 5 ,Mod 10), Pin configuration of IC	15

| | 7490 Shift register (SISO, SIPO, PIPO, PISO) Pin Configuration of IC 7495), Applications of Sequential Logic Circuits. | |

Reference books:

    1. Digital principle & applications – Malvino Leech.3

  2. Digital principle – Floyed.

  3. Digital electronics – C. F. Strangio

B.C.A. – I (Semester-II)

Course Title:-Introduction to Microprocessor and Interfacing

Paper Type: DSC 4B   **Paper Code: IV**

Credits: Theory – (2)   **Practical – (2)**
Total Lectures: 30 Hrs.   **Contact Hrs. (L):** 2.5
University Evaluation: 40 Marks   **Internal Evaluation:** 10 Marks

Course Objective:

1. To develop specialists in hardware-software co-design for application specific electronic system.
2. To prepare students for demonstrating the acquired knowledge.
3. To encourage student to develop skills for accepting challenges of upcoming technological advancements.

Course Outcomes:

1. Design, test and critically evaluate embedded solutions to real world situations using digital components (sequential and combinational).
2. Recognize the key features of embedded systems in terms of computer hardware and be able to discuss their functions. You will be aware of the key factors affecting computing hardware evolution.
3. Design, test and critically evaluate embedded solutions to real world situations using (embedded) computer systems interfaced to digital hardware

Unit No.	Description	No. of Lectures
I	**Fundamentals of 8085 Microprocessor** Introduction to microprocessor, Basic system bus architecture, Concept of T state Machine cycle, Instruction cycle, pin function of 8085 microprocessor, internal architecture of 8085 microprocessor **Instruction set of 8085:** instructions Format, Classification of instruction set, Addressing modes, Assembly language programming of 8085 (addition, subtraction, division, multiplication) Intel 8085 microprocessor features	15
II	**Introduction to interfacing of computer devices** Concept of interfacing , I/O interfacing method , I/O mapped I/O , memory mapped I/O , programmed I/O , interrupt driven I/O , interfacing of keyboard , interfacing of printer	15

| | with block diagram
Memory devices : concept of cache memory and associative memory , DMA controller , DMA transfer | |

Reference books:
1. Microprocessor Architecture programming and Application
    -Ramesh Gaonkar
2. Morris Mano Computer System Architecture (3rd Edition) PHP

Type: Core Practical
(Practical-I based on Paper Code: DSC 1A, DSC 1B)

Total Marks: 100   **Practical: 60 Lectures**
Teaching Scheme: Practical 8 Pract. /Week   **Total Credits: 04**

Practical based on: DSC 1A

Tools / Software: Microsoft Office / Notepad++ / DosBox

1. DOS – external and internal commands, batch files.
2. MS – WORD – Creating new documents, typing, deleting, selecting text, undo, Redo, formatting text Paragraphs, line spacing, margins, page setup, headers and footers.
3. Writer's tools – spelling checker, format painter, creating mail merge document.
4. MS – EXCEL - Creating worksheet, Graphs, resizing graphs, formulas, if Statement, types of functions.
5. MS-Powerpoint-Creating presentation, slideshow, adding slides, inserting clip arts, smart art, images, sound files linking etc.
6. Internet – creating e – mail accounts, browsing.

Practical based on: DSC 1B

Tools (Open Source) Softwares: Python Interpreter, Idle Graphics Window, Command Prompt, System Prompt, PyCharm, Visual Studio Code, Jupyter Notebook.

1) Write a python program to find the sum of a list of numbers using for loop.
2) Write a python program to display stars in right angled triangular form using nested for loops.
3) Write a python program to display multiplication table from 1 to 10 using nested for loops.
4) Write a python program to display numbers from 10 to 6 and break the loop when the number about to display 5.
5) Write a python program to display numbers from 1 to 5 using the continue statement.
6) Write a python program to find the first occurrence of sub string in a given main string.
7) Write a python program to display elements in a list in reverse order.

8) Write a python program to accept elements in the form of a tuple and display their sum and average.

9) Write a python program to create a dictionary with employee details and retrieve the values upon giving keys.

10) Write a function to test whether a number is prime or not.

11) Write a function to return the addition and subtraction of two numbers using a function return two values.

12) Write a python program to demonstrate the different methods of array module.

13) Write a python program to demonstrate the types of array.

14) Write a python program to understand the positional arguments of a function

15) Write a python program to understand the keyword arguments of a function

Type: Core Practical
(Practical-II based on Paper Code: DSC 2A, DSC 2B)

Total Marks: 100   **Practical: 60 Lectures**
Teaching Scheme: Practical 8 Pract. /Week   **Total Credits: 04**

Tools / Software: Turbo C++ Editor /Notepad++/ DosBox/Visual Studio Code (VS Code)

Practical based on: Programming and Problem Solving using 'C' – I & II

1. WAP to find out factorial of any number.
2. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. Write a function that checks whether a given number is perfect or not.
4. Write a function to find whether a given no. is prime or not.
5. WAP to compute the factors of a given number.
6. WAP to find out palindrome numbers between 1 to 100.
7. Write a macro that swaps two numbers.
8. WAP to print a triangle of stars as follows (take number of lines from user):

```
        *
       ***
      *****
     *******
    *********
```

9. WAP to perform following actions on an array entered by the user:
i) Print the even-valued elements
ii) Print the odd-valued elements
iii) Calculate and print the sum and average of the elements of array
iv) Print the maximum and minimum element of array

v) Remove the duplicates from the array

vi) Print the array in reverse order

10. WAP a program to find out entered number is palindrome or not?

11. Write a program to display weekday name when user entered any day's first character (e.g.S=Sunday)

12. Write a program to calculate multiplication of two matrices.

13. Write a program that swaps two numbers using pointers.

14. Write a program in which a function is passed address of two variables and then alter its contents.

15. Write a program which takes the radius of a circle as input from the user, passes it to anotherfunction that computes the area and the circumference of the circle and displays the value ofarea and circumference from the main() function.

16. Writea programwhichcounttotalnumberofvowelspresentinstring.

17. Write a program to find sum of n elements entered by the user.

18. Write a program to allocate memory dynamically using malloc() & calloc().

19. WAP to illustrate difference between structure and union.

20. WAP to pass array of structure to function.

21. WAP to copy content of one file into another file.

22. WAP to display content of binary files.

23. Write a program to accept integer numbers in file,find even and odd numbers between them store even number into even file and odd number into odd file and display the content of files.

Practical based on: Web **Programming– I & II**

1. Design HTML page to display student Information.

2. Design HTML page for all lists.

3. Design HTML page for display Table.

4. Design HTML page for Image map, frameset tags.

5. Create a web page using the Internal/ Linked/ External style sheet.

6. Create web page using Text formatting properties, CSS Borders, Margin Properties, Color properties.

7. Create web page Using DIV and SPAN tag properties.

8. Write a JavaScript code working with functions: the alert Box, the confirm Box , the prompt Box etc.

9. Create standard calculator using JavaScript.

10.   Create XML page to display student information.

Type: Core Practical
Practical based on: Mathematics
(Practical-III based on Paper Code: DSC 3A, DSC 3B)

Total Marks: 100   **Practical: 60 Lectures**
Teaching Scheme: Practical 8 Pract. /Week   **Total Credits: 04**

1. Algebra of matrices: addition, subtraction,scalar multiplication, matrix multiplication.
2. Operations on Sets: Union, intersection, difference, symmetric difference and complement.
3. Algebraic properties of set operations: Commutative laws, Distributive laws,Associative laws,DeMorgan's laws.
4. Transitive closure of relation by using Warshall's algorithm.
5. Matrix representation of graph: Adjacency and incidence matrix of a graph.
6. Traveling salesman problem and Chinese postman problem.
7. Operations on graphs: Union, intersection, ring sum of two graphs, andcomplement of a graph.
8. Kruskal's algorithm to find shortest spanning tree.
9. Construction of frequency dist. & graphical representation.
10. Measures of central tendency
11. Measures of dispersion.
12. Computation of correlation coeff.
13. Fitting of lines of regression.
14. Fitting of Binomial distribution.
15. Fitting of Poission distribution.
16. Model sampling from uniform.

Type: Core Practical
Practical based on: Electronics
(Practical-IV based on Paper Code: DSC 4A, DSC 4B)

Tools: Digital trainer kit/circuit board, Anshuman 8085 Kit,

1. Study of instruments & measurement techniques (Multimeter, CRO, and F.G.)
2. Study of electronic components
3. Half Wave Rectifier
4. Full wave rectifier.
5. Positive Voltage regulator by using three pin IC (7805)
6. Negative Voltage regulator by using three pin IC (7905)
7. Transistor as a switch
8. Study of Logic Gates
9. Interconversion of Gates by using NAND
10. Interconversion of Gates by using NOR
11. Demorgans Theorem
12. Study of Half adder
13. Study of Full Adder
14. Study of Flip Flop R-S (using NAND) and D Flip Flop
15. Arithmetic Operation using 8085
16. Addressing Modes-I of 8085
17. Block transfer using 8085

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Faculty of Science and Technology
Equivalent Subject for Old Syllabus BCA - I (Semester –I and II)

Semester-I		
Sr. No.	**Name of the Old Paper (w.e.f.2019-20)**	**Name of the New Paper (w.e.f.2022-2023)**
1	English Paper I Part-A (communication skill)	English Paper I Part-A (communication skill)
2	Fundamentals of Computer	Fundamentals of Computer
3	Logic Development With 'C' Programming	Programming and Problem Solving using 'C' – I
4	Basics of Web Programming – I	Web Programming-I
5	Software Engineering- I	No Equivalence
6	Basics of Mathematics – I	Basics of Mathematics
7	Statistical Methods-I	Descriptive Statistics
8	Digital Electronics	Fundamentals of Electronics
9	Development of Human Skills	No Equivalence
Semester-II		
Sr. No.	**Name of the Old Paper (w.e.f.2019-20)**	**Name of the New Paper (w.e.f.2022-2023)**
1	English Paper I Part-B (communication skill)	English Paper I Part-B (communication skill)
2	Advanced Programming in C	Programming and Problem Solving using 'C' – II
3	Introduction to Operating System	Operating System
4	Basics of Web Programming – II	Web Programming-II
5	Office Automation	Office Automation
6	Basics of Mathematics – II	Graph Theory
7	StatisticalMethods-II	Probability Thoery
8	Introduction to Microprocessor	Introduction of Microprocessor and Interfacing
9	Software Engineering- II	No Equivalence

Nature of Question Paper

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Nature of Question Paper for Choice Based Credit System(CBCS) Semester Pattern

Faculty of Science (w.e.f. June 2022 for BCA-I and from June 2023 BCA-II)

Time: 2 Hrs.   Total Marks:40

Instructions: (Instructions may differ from subject to subject)

        1. All questions are compulsory.

        2. Draw **neat diagrams** and give equestion whenever necessary.

        3. Figur to the right indicates **full marks**.

        4. Use of logarithmic table and calculator is allowed.

Q.No.1) Multiple choice questions.   **(8)**

    1. _____

    a)   b)   c)   d)

    2.

    3.

    4.

    5.

    6.

    7.

    8.

Q.No.2) Answer any four of the following.   **(8)**

   I.

  II.

 III.

 IV.

Q.No.3) Write a short note on any two of the following.   **(8)**

   I.

  II.

 III.

Q.No.4) Answer any two of the following.   **(8)**

   I.

  II.

 III.

Q.No.5) Answer any one of the following.   **(8)**

   I.

  II.

For Science faculty: CA- Contineous Assessment (Internal Examinations) of Total Marks: 10

Pattern / Examination nature may be as follows:

One internal examination of 10 marks or two examinations of 5 marks each.

Open book examination / Home Assignment / Classroom test / Seminar / Field Work report / Project Report etc.