SHRI GURU RAM RAI UNIVERSITY

[Estd. by Govt. of Uttarakhand, vide Shri Guru Ram Rai University Act no. 03 of 2017 & recognized by UGC u/s (2f) of UGC Act 1956]

SYLLABUS

FOR

Bachelor of Computer Application (BCA)

Ist Year

As per NEP 2020

School of Computer Application & Information Technology

(w.e.f. 2022-2023)

Programme outcome (POs)

Students will be able to

PO1	Ability to demonstrate knowledge of Computer science and its applications in order to enhancebasic understanding of various software technologies.
PO2	Ability to analyze and identify various business and technical problems to further solve problemswith effective communication.
PO3	Ability to adapt analytical, logical and managerial skills with the technical aspects in order to design and deploy reliable software programs and application for real world problems
PO4	Ability to investigate complex problems and provide computer-based solutions.
PO5	Ability to understand and deliver ethical, social and cultural responsibilities in professional environment as an individual and team.
PO6	Ability to adapt new technologies for upgrading their skills and contributing to a life long learning.
PO7	Ability to create and manage multidisciplinary projects and successfully apply software and project management principles.
PO8	Ability to become employable in a variety of IT companies and government sector and also seek entrepreneurship opportunities for the betterment of an individual and society a large.
PO9	An ability to design and implement database solutions using available technologies.
PO10	Acquired skills and to recognize the need for life-long learning for continuing professional development.
PO11	Excellent verbal communication skills with capability to work in multidisciplinary teams with positive attitude
PO12	An ability to work effectively as an individual as well as a member of a team and provide technical and visionary leadership to others.

Eligibility for admission:

Intermediate (Class XII) in any discipline with minimum 45% marks and Maths as compulsory subject at 10+2.

Duration of the Programme: 3/4 years

Examination Scheme:

Components	Internal Exam	Assignment & Teacher Assessment	External (ESE)
Weightage (%)	15	15	70

STUDY & EVALUATION SCHEME
Choice Based Credit System
Bachelor of Computer Application (BCA)

First Semester

S. No.	Course Category	Couse Code	Course Name	Periods				Evaluation scheme		Subject Total
				L	T	P	C	Sessional (Internal)	External (ESE)	
Theory										
1	Major/Core	BCA101	Programming in 'C'	3	1	-	4	30	70	100
2	Major/Core	BCA102	Computer Fundamental & Information Technology	3	1	-	4	30	70	100
3	Major/ Elective	BCAME103A	Digital Electronics	3	1	-	4	30	70	100
		BCAME103B	Computer Based Numerical Techniques							
4	Minor/Open	BCAOE104	Office Automation - I	2	-	-	2	30	70	100
5	Vocational	BCAVC105	Mathematical Foundation of Computer Science	3	-	-	3	30	70	100
6	Co-Curricular	BCACC106	General English	2	-	-	-	30	Grade	
Practical										
7	Major/Core	BCAP11	Programming in 'C' Lab	-	-	4	2	30	70	100
8	Major/Core	BCAP12	Computer Fundamental Lab	-	-	4	2	30	70	100
			Total	**14**	**3**	**8**	**21**	**240**	**490**	**700**

Second Semester

S. No	Course Category	Couse Code	Course Name	Periods				Evaluation scheme		Subject Total
				L	T	P	C	Sessional (Internal)	External (ESE)	
Theory										
1	Major/ Core	BCA201	Data Structure & File Organization	3	1	-	4	30	70	100
2	Major/ Core	BCA202	Core Java	3	1	-	4	30	70	100
3	Major/ Elective	BCAME203A	Computer Organization & Architecture	3	1	-	4	30	70	100
		BCAME203B	Introduction to logic							
4	Minor/ Open	BCAOE204	Office Automation - II	2	-		2	30	70	100
5	Vocational	BCAVC205	Cyber Security	3	-	-	3	30	70	100
6	Co-Curricular	BCACC206	Communication Skills	2	-	-	-	30	Grade	
Practical										
7	Core	BCAP21	Data Structure & File Organization Lab	-	-	4	2	30	70	100
8	Core	BCAP22	Core Java Lab	-	-	4	2	30	70	100
			Total	**14**	**3**	**8**	**21**	**240**	**490**	**700**
Exit option with **Certificate in Computer Applications** (with the completion of courses equivalent to a minimum of **42 credits**)				**Total Credits (I^{st} & II^{nd} Sem)**			**42**	**Total Marks (I^{st} & II^{nd} Sem)**		**1400**

Major Elective Basket

Select any one subject in a semester

Semester	Course Code	Course Name
1	BCAME103A BCAME103B	Digital Electronics Computer Based Numerical Techniques
2	BCAME203A BCAME203B	Computer Organization & Architecture Introduction to logic

Minor/Open Elective Basket

School	Departments	Minor Elective Paper I & II Semester	Minor Elective Paper III & IV Semester
School of Humanities and Social Sciences	Hindi	□□□□□ □□□□ और □□□□□□	हन्दी गध साहित्य
	English	Review of Grammer	Professional English
	Defence & Strategic Studies	Military Hisory of Uttarakhand	Cyber Security
	Drawing & Painting	Creative Process in drawing	Applied Art
	Geography	Physical Geography	Fundamental of Natural disasters
	Home Science	Fundamentals of Nutrition	Family Resource Management-1
	Music	Critical study of Rags & Taals	Voice Modulation
	Psychology	Psychology for living	Psychology of gender
	Economics	Fundamentals of Economics	Basics of Demography
	History	History of India from the earliest times upto 300 CE Indian society and culture through the ages	History of Medieval India
	Political Science	Awareness with Civic Rights	Reading Gandhi
	Garhwali	□□□□□□ □□□□□□□□	
	Statistics	Statistical Methods & Probability Theory	Sampling distribution
	Mass Communication	Introduction to Journalism	Introduction to Broadcast Media
	Yoga	Fundamental of Yoga	Basic Practicum-1 Basic Practicum-2
School of Computer Application & Information Technology	Computer Application	Office Automation	Management Information System
	Information Technology	Fundamental of Computer & Information Technology.	Web Designing
School of Management & Commerce Studies	Management	Entrepreneurship Development	Indian Business & Economy
	Commerce	Entrepreneurship and Small Business	Banking And Micro Finance
	Hospital Administration	Business Statistics	Fundamentals of Accounting

School of Basic & Applied Sciences	Zoology	Environmental science and Basic concepts of Ecology	Bio-Instrumentation, Bioinformatics and Biostatistics
	Geology	Geohydrology	Remote Sensing and GIS
	Mathematics	Elementary Algebra and Trigonometry	Analytical Geometry
	Botany	Plant Science-I	Plant Science-II
	Biotechnology	Advance Bioinformatics 1	Bioethics and Biosafety
		Advanced Bioinformatics II	Biotechnology and Human Welfare
	Chemistry	Basic Analytical chemistry-I	Basics of Analytical Chemistry-II
	Microbiology	Introduction and Scope of Microbiology-I	Intellectual Property Right
		Introduction and Scope of Microbiology-II	Biotechnology and Human Welfare
	Physics	Statistical Physics/Numerical methods/ Waves and Oscillations	Solid State Physics/Optoelectronic Devices/Classical Dynamics

CO-CURRICULAR BASKET

S.N	School	Departments	Vocational/Skill Development Courses
1	School of Humanities and Social Sciences	Hindi	* □□□□□□□□□□□ □□□□□
2		English	* Communicative English Grammar * English Listening and Speaking Skills
3		Geography	* Field Survey *Elements of Map Reading
4		Home Science	* Fundamentals of Nutrition & cooking skills with healthy recepie Development
5		Defence & Strategic Studies	* Fundamentals of Disaster Management
6		Music	* Practical Aspects of Indian Music
7		Psychology	* Managing Stress
8		Economics	* Labour Economics-I
9		History	* Introduction of Archeology
10		Political Science	* Issues of rural government * Study of Voting Pattern and Voting Behaviour
11		Statistics	* Network analysis & theory of sequencing
12		Garhwali	□□□□□□- □□□□□□ □□□□□□ □□□□ □□ □□□□□□
13	School of Computer Application & Information Technology	Computer Application	General English
14			Communication Skills
15			Environmental Science
16			Logical Reasoning
17			Health Awareness and Hygiene
18			PDP
19		Information Technology	Environmental Studies
20			Professional Communication
21			Healthcare and Hygiene
22			Personality Development & Formal Writing
23			Logical reasoning
24			Numerical Aptitude
25	School of Management & Commerce Studies	Management	Basics Microsoft Excel
26			Advanced Excel
27			Logical Reasoning
28			PDP
29			E-Filling and Taxation
30			Digital Marketing

31		Commerce	Basics of MS-Office
32			IT Tools for Corporates
33			Mathematical Aptitude
34			Soft Skills
35			E-Filing of Return
36			Social Media Marketing or Tally
37		Hospital Administration	Microsoft Excel
38			Advanced Excel
39			Logical Reasoning
40			Communication skills and Personality Development
41			Direct Tax (Return filing)
42			Content Marketing
43	School of Basic & Applied Sciences		English Communication
44			Environmental Science
45			Management Paradigms from Bhagavat Gita
46			Meditation
47			Vedic Science
48			Essence of Indian Traditional Knowledge
49			Molecular Diagnostics
50			Drug Designing
51			Basic concept of Ecology
52			Human Development
53			Smart Farming
54			Enzymology/ Drug Designing/ Evolutionary Biology
55			Human Development
56			Communication Skills

Course code	**: BCA101**			
Course Name	**: Programming in 'C'**			
Semester /Year	**: Ist Semester**			
L	**T**	**P**	**C**	
3	**1**	**0**	**4**	

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. Understand the basics of Programming Paradigms,
2. To learn the basic concepts and syntax of C programming.
3. To be able to develop logics which help them to create programs and applications using C language.
4. To learn the use of C libraries functions in C language.
5. To learn the file handling and basic memory allocation concepts in C language.
6. After learning the C programming they can easily switch over to any other language

COURSE CONTENTS

UNIT-I **[No. of Hours: 7]**

History of 'C' Programming, Types of Programming Languages. Introduction to C and structure of 'C' Program, some simple C programs, Desirable program characteristics. C Fundamentals- C character Set, Identifiers and keywords, datatypes, constants, variables and arrays, Declarations, expressions, statements, Symbolic constants.

UNIT –II **[No. of Hours: 10]**

Operators and expressions- Arithmetic operators, unary operator, Relational and logical operators, assignment operators, conditional operators, Library Functions. Data Input and Output- Preliminaries, singe character input, singe character output, entering input data, writing output data, the gets and puts function. Precedence and associatively of operators, Side effects, Type conversion, Managing input and output.

UNIT-III **[No. of Hours: 10]**

Control Statements- Preliminaries, Branching, Looping, Nested control statements, switch statement, break statement, the continue statement. Arrays: Defining an array, processing an array, passing arrays to functions, Multidimensional arrays, Arrays and strings. **Functions:** A brief overview, defining a function, accessing a function, function prototypes, passing arguments to a function, recursion. Storage classes.

UNIT-IV **[No. of Hours:6]**

Pointers- Fundamentals, Pointer declarations, Passing pointers to the functions, pointers and one-dimensional array, dynamic memory allocation, Operations on pointers, arrays of pointers. Pointer to Pointer, call by value call by reference, pointer to function.

UNIT-V **[No. of Hours: 7]**

Structure &Union: Declaration & Initialization of Structure & Union, Array of Structure, passing structure to a function, union and array as member, of union, concept of memory saving and union. Data files- Opening and closing a data file, creating a data file, processing a data file, unformatted data files. Command line argument in 'C'.

Text Books:

TB1. Pointers in C, KanetkarY.P. , BPB Publications
TB2. Kanetkar Y.P., Let us C, BPB Publications

Reference Books:

RB1. The C programming language, Kernighan and Ritchie, PHI
RB2. The Spirit of C, Cooper Mullish, Jaico Publishing House, Delhi

Course Outcomes (CO):

After completion of the course, a student will be able to

CO#	Detailed Statement of the CO
CO1	Identify the basic concepts of C programming language & improve the understanding, remembering of using data types, variables and arithmetic operations in C programming.
CO2	Understanding Array String, Functions concepts and implement array and string using functions.
CO3	Apply the concept of pointer & preprocessor directives. In addition, resolve real world problems Able to design and develop various programming problems using C programming concepts.
CO4	Analyze the concepts of structure and union & dynamic memory allocation by using malloc and calloc function etc.
CO5	Evaluate file handling using C Programming language.
CO6	plan a project using C programming language.

CO-PO Mapping:

	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	2	1	1	1					
CO2	2	2	1	1	1	1	1					
CO3	1	2	2	2	1	1	1	1				
CO4	1	2	2	2	1	1	1					
CO5	2	1	1		1	1	1	2				
CO6			1		2	2	3					
AVG	1.3	1.3	1.5	1.1	1.1	1.1	1.3	0.5				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:**	**BCA102**			
Course Name	**:**	**COMPUTER FUNDAMENTAL & INFORMATION TECHNOLOGY**			
Semester /Year	**:**	**Ist Semester**			
		L	**T**	**P**	**C**
		3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To provide understanding of the various components and functional units of computers, their design and working.
2. To provide insight into digital systems and logic circuit design.

COURSE CONTENTS

UNIT I Introduction to Computers [No. of Hours: 8]

Generation of Computer, Hardware Components, Memory Devices, Magnetic Disk, Floppy Disk, Compact Disc/ DVD; Input Devices- Keyboard, Mouse, Scanner, OCR, OMR, MICR. Output Devices- Printer, Types of Printer, Plotter, Monitor: CRT; Central Processing Unit, CPU- Arithmetic Logic Unit, Control Unit, Instruction Set, Registers, Processor Speed, Type Of Processors; Memory- Main Memory Organization, Main Memory Capacity, RAM, ROM, EPROM, PROM, Cache Memory, OCR, OMR, MICR.

UNIT II Number Systems [No. of Hours: 6]

Number Systems: Binary, Decimal, Octal, Hexadecimal, Binary Arithmetic, Character Codes (BCD), Excess-3, Gray Code, ASCII

UNIT III –System Software and Application Software [No. of Hours: 10]

System software, utility packages, compilers, interpreters, Operating Systems, Elementary commands of DOS, Booting.

Application softwares– word-processing, spreadsheet, presentation graphics, Data Base Management Software, Characteristics, Virus- working, features, types of viruses, virus detection prevention and cure.

UNIT IV - Programming Languages and Algorithms [No. of Hours: 8]

Generation of Languages: Machine language, Assembly languages, High level languages, Language translators (Compiler, Interpreter, Assembler) , Syntax error, Logical error, runtime error, General concepts of OOPS (Object oriented programming), Structured Query Language

Algorithm development, techniques of problem solving- Flowchart, Pseudo-code, Decision trees, Programming paradigms: Top-down, bottom-up etc.

UNIT V – Computer Network & Communication Technologies [No. of Hours: 8]

Communication system elements, communication modes (simplex, half duplex and full duplex analog and digital, synchronous and Asynchronous, Communication media: wired and wireless, LAN WAN, MAN, network topologies.

Text Books:

TB1. Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals". BPB Publications.
TB2. Rajaraman, V., "Fundamental of Computers". Prentice Hall India, New Delhi
TB3. Dorothy House(2015), "Microsoft Word, Excel, and PowerPoint: Just for Beginners. Outskirts
TB4. Press 2 Peter Norton(2017), "Introduction to Computers",4th Edition, TMH Ltd, New Delhi.

Reference Books:

RB1. Sanders D.H, Computers Today

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO#	Detailed Statement of the CO
CO1	Describe the knowledge of basic components of computer systems and its functionality.
CO2	Understand the classification of various types of memory in computer and concept of input and output devices and.
CO3	Solve the number systems by applying various types of conversion techniques and their representations.
CO4	Illustrate an operating system by analyzing its working learn basic word processing, spreadsheet and presentation graphics and learn about various viruses and prevention from them.
CO5	Evaluate various problem solving techniques like algorithm, flowchart etc. and Learn generation of languages, basic concepts of OOPs, SQL etc.
CO6	Design and Develop computer network and various communication modes, communication media like LAN, MAN, WAN etc.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1			1						1	1	1
CO2	2				1		1	1		1	1	1
CO3	2	1	1	3	1	1		1		1	1	1
CO4	3	2	2	2	1	2	1	2	1	1	1	1
CO5	3	1	1	2	2	2	2	3	2	2	2	2
CO6	3	1	1	2	2	2	2	3	2	2	2	2
AVG	**2.3**	**0.8**	**0.8**	**1.6**	**1.1**	**1.1**	**1**	1.6	0.8	1.3	1.3	1.3

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BCAME103A**			
Course Name	**: Digital Electronics**			
Semester	**: Ist Semester**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
3. To implement simple logical operations using combinational logic circuits.
4. To design combinational logic circuits, sequential logic circuits.

COURSE CONTENTS

Unit 1 **[No. of Hours: 6]**

Binary Systems and Logic Circuits: The Advantage of Binary, Number Systems- Binary, Octal, Decimal and Hexadecimal. Conversions between number systems. Use of Binary in Digital Systems, Logic Gates, Logic Family Terminology.

Unit 2 **[No. of Hours: 6]**

Binary Arithmetic: Binary Addition, Subtraction, Multiplication and Division. Complements, Representation of Signed and Unsigned numbers – Signed magnitude , Signed 1's Complement, Signed 2's complement, Decimal subtraction using 9's and 10's complement, Binary subtraction using 1's and 2's complement.

Unit 3 **[No. of Hours: 8]**

Boolean Algebra and Mapping Methods: Boolean Algebra, SOP and POS forms of representation, minterms and maxterms, Simplification of logic functions by theorems and Karnaugh's map, don't care conditions, Realizing Logic Function with Gates, Combinational Design Examples.

Unit 4 **[No. of Hours: 10]**

Combinational Logic: Adders- Half adder and full adders, Subtractors- Half and Full Subtractors, Encoders and Decoders, Multiplexers and De-multiplexers.

Unit 5 **[No. of Hours: 10]**

Sequential Logic: Latch, Flip Flops- SR, Data, JK & Toggle

Registers: Serial-in-Serial-Out, Serial-in-Parallel-Out, Parallel-in-Serial-Out, Parallel-in-Parallel-Out Shift registers

Counters- Synchronous and Asynchronous/ Ripple counters, Design of Ripple counter - Modulo-n counter.

Text Books:

TB3. M. M. Mano, Digital Design, 3rd ed., Pearson Education, Delhi, 2003.
TB4. D.P. Leach, Malvino, Guha, Digital Principles and Applications, TMH, New Delhi, 2011.

Reference Books:

RB1. T. L. Floyd and Jain, Digital Fundamentals, Pearson Education, 2003.
RB2. R.J. Tocci and N.S. Widner, Digital Systems - Principles & Applications, PHI, 10th Ed., 2007

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	Identify and represent numeric information in different forms.
CO2	Understand machine level representation of data and perform operations on it.
CO3	Apply K-Maps and Tabulation methods for Simplification of Boolean expressions and construct logic circuit.
CO4	Analyse logic circuits and deduce logic expressions and truth tables.
CO5	Evaluate digital number systems and use Boolean algebra theorems, Properties and Canonical form for digital logic circuit design.
CO6	Design and analyse small combinational & sequential circuits to build larger more complex circuits.

CO-PO Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	1	1	1	-	2	-	-	-	2	-	-
CO2	2	1	2	2	-	2	-	-	-	1	-	-
CO3	3	2	2	2	-	1	-	-	-	1	-	-
CO4	2	1	1	3	-	1	-	-	-	1	-	-
CO5	2	1	1	3	-	1	-	-	-	1	-	-
CO6	3	1	1	1	-	2	-	-	-	2	-	-
AVG	**2.5**	**1.2**	**1.3**	**2**	**0**	**1.5**	**0**	**0**	**0**	**1.3**	**0**	**0**

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCAME103B				
Course Name : COMPUTER BASED NUMERICAL TECHNIQUES				
Semester /Year : Ist Semester				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. Overview of some of the issues and problems that arise in scientific computation, such as (non-)linear systems, numerical and symbolic integration, differential equation and simulation.
2. Suitable and effective methods called Numerical Methods, for obtaining approximate representative numerical results of the problems.
3. Problems in the field of Applied Mathematics, Theoretical Physics and Engineering which requires computing of numerical results using certain raw data.
4. To solve complex mathematical problems using only simple arithmetic operations. The approach involves formulation of mathematical models of physical situations that can be solved with arithmetic operations.
5. To deal with various topics like finding roots of equations, solving systems of linear algebraic equations, interpolation and regression analysis, numerical integration & differentiation, solution of differential equation, boundary value problems, solution of matrix problems.

COURSE CONTENT

Unit I **[No. of Hours: 10]**

Floating point Arithmetic: Representation of floating point numbers, Operations, Normalization, Pitfalls of floating point representation, Errors in numerical computation.

Unit II **[No. of Hours: 10]**

Iterative Methods: Zeros of a single transcendental equation and zeros of polynomial using Bisection Method, Iteration method, Regula-Falsi method, Newton Raphson method, Secant method, Rate of convergence of iterative methods.

Unit III **[No. of Hours: 10]**

Simultaneous Linear Equations: Solutions of system of Linear equations, Gauss Elimination direct method and pivoting, III conditioned system of equations, Refinement of solution. Gauss Seidal iterative method, Rate of Convergence. Interpolation and approximation: Finite Differences, Difference tables. Polynomial Interpolation: Newton's forward and backward formula. Interpolation with unequal intervals: Language's Interpolation, Newton Divided difference formula.

Central Difference Formulae: Gauss forward and backward formula, stirling's Bassel's Everett's formula. Approximation of function by Taylor's series and Chebyshev polynomial.

Unit IV **[No. of Hours: 10]**

Numerical Differentiation and Integration: Introduction, Numerical Differentiation, Numerical Integration, Trapazoidal rule, Simpon's rules, Boole's Rule Euler-Maclaurin Formula, Solution of Differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta methods.

Text Books:

TB1. Rajaraman V., :Computer Oriented Numerical Methods". PHI
TB2. Grewal B.S., "Numerical methods in Engineering and Science. Khanna Publishers, Delhi.

References Books:

RB1. Gerald and Wheatley, "Applied Numerical Analyses", AW
RB2. Jain, Lyengar and Jain, "Numerical Methods for Scientific and Engineering Computations:, New Ager Int.
RB3. T.Veerarajan, T Ramchandran, "Theory and Problems of Numerical Methods", TMH

Course outcomes (COs):
Upon successful completion of the course a student will be able to

CO#	Detailed Statement of the CO
CO1	Illustrate the basic understanding of commonnumerical methods used to obtain approximate solutions to otherwiseintractable mathematical problems.
CO2	Understand and interpret Numerical analysis which has enormous applications in the field of Science and some fields of Engineering.
CO3	Solve numerical methods for various mathematical operations and tasks.
CO4	Analyse and evaluate the accuracy of common numerical methods.
CO5	Evaluate calculation and interpret of errors in numerical method.
CO6	Design and able to solve the problem by Numerical Differentiation and Integration etc.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2										
CO2	1	3	2	1	1							
CO3	1	3		1								
CO4		3	2	1	1					1		
CO5	1	2	1	1						1		
CO6	1	2	3	1	3	1	1	1	1	3	2	1
AVG	**1.1**	**2.5**	**1.3**	**0.8**	**0.8**	**0.1**	**0.1**	**0.1**	**0.1**	**0.8**	**0.3**	**0.1**

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BCAOE104 (Minor/Open Elective)**			
Course Name	**: OFFICE AUTOMATION - I**			
Semester /Year	**: Ist Semester**			
	L	**T**	**P**	**C**
	2	**0**	**0**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objective:

- Office tools course would enable the students in crafting professional word documents, excel spread sheets using the Microsoft suite of office tools.
- To familiarize the students in preparation of documents and Spreadsheets with office automation tools.

COURSE CONTENTS

UNIT- I MS-WORD **[No. of Hours: 10]**

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, colour etc., 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.

UNIT –II MS-Excel **[No. of Hours: 10]**

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 & replace, 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. Creating Charts -Drawing. Printing.

Text Books:

TB1. Microsoft Office Word, Torben Frandsen, 2010, Torben Lage Frandsen &Ventus Publishing Aps
TB2. Step-By-Step Optimization With Excel Solver The Excel Statistical, Mark Harmon

Course Outcomes (COs):

Upon successful completion of the course a student will be able to

CO#	Detailed Statement of the CO
CO1	Define, name various tools used in MS Word, MS Excel
CO2	Compare, contrast, explain terms used in MS Word, MS Excel
CO3	Apply MS Word & MS excel to create personalized documents and spreadsheets
CO4	List, analyze various short cut keys used in MS excel, MS word
CO5	Explain Mathematical operations used in MS Excel
CO6	Build MS Word & MS excel documents for various case studies,

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1		2	1	1		1			
CO2	3	1	1		2	1	1		1			
CO3	3	1	1		2	1	1		1			
CO4	3	1	1		2	1	1		1			
CO5	3	1	1		2	1	1		1			
CO6	**3**	**1**	**1**		**2**	**1**	**1**		**1**			
AVG	**3**	**1**	**1**		**2**	**1**	**1**		**1**			

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCAVC105				
Course Name : MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE				
Semester /Year : Ist Semester				
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. Know the basic principle of set theory, relations, function and its operations.
2. Able to Understand the concepts of groups, and elementary properties of Rings and Fields.
3. Learn the logical notation and determine if the argument is or is not valid in preposition and predicate logic.
4. Learn the representation of lattices with POSET.
5. Learn the concepts of graphs, trees and it's traversal, and recurrence relations.

COURSE CONTENTS

UNIT I **[No. of Hours: 8]**

Set Theory: Set, Subset, Operation on sets, DeMorgan's Law, Power set of set. Matrices: Matrices operations, Transpose, Inverse and power of Matrices.

UNIT II **[No. of Hours: 8]**

Relation: Type and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation. Function: Types, Composition of function, Recursively defined function.

UNIT III **[No. of Hours: 8]**

Mathematical Induction: Piano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions, Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients, Asymptotic Behaviour of functions

UNIT IV **[No. of Hours: 8]**

Algebric Structures: Properties, Semi group, monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups.

UNIT V **[No. of Hours: 8]**

Prepositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.

Text Books:

TB5. Kenneth H. Rosen, "Discrete Mathematics and its applications', TMH.
TB6. Liptschutz, Seymour, "Discrete Mathematics", TMH.".

Reference Books:

RB1. Hopcroft J.E. Uliman J.D., "Introduction to Automata Theory, Language and Computation" Narosa Pub. House, New Delhi.
RB2. C.L.Liu "Elements of Discrete Mathematics", McGraw Hill.

Course Outcomes (CO):

After completion of the course, a student will be able to

CO#	Detailed Statement of the CO
CO1	Illustrate the basic concepts of sets, matrices
CO2	Understand the various concepts of relations and functions
CO3	Teach to use mathematical induction to solve various linear and non-linear, asymptotic behaviour of a function etc.
CO4	Analyse and illustrate representation of lattices and be able to determine their properties with Boolean algebra.
CO5	Able to evaluate the use Algebraic Structures like various types of groups and permutation groups
CO6	design posset and hasse diagrams and solve various types of logic by using prepositional logic

CO-PO Mapping:

	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1		1		2	1					1
CO2	1	1		2	1	1	2					1
CO3	1	2	2	2	2	1	2	1				2
CO4	2	1		2		2	1	1				1
CO5	1	3	2	1	1	2	1	1				2
CO6	1	3	2	1	2	2	2	2	1	1	1	1
AVG	**1.1**	**1.8**	**1**	**1.5**	**1**	**1.6**	**1.5**	**0.8**	**0.1**	**0.1**	**0.1**	**1.3**

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCACC106				
Course Name : GENERAL ENGLISH				
Semester /Year : Ist Semester				
	L	**T**	**P**	**C**
	2	**0**	**0**	**-**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To familiarize the students with the basic communication skills.
2. To enhance the written and speaking skills of the students.
3. To develop the confidence and ability to communicate effectively among the students.
4. To teach the students essentials of English language.
5. To enhance the employability skills.

COURSE CONTENTS

UNIT 1: English Grammar [No. of Hours: 10]

Important aspects of English Grammar- Speech and its uses- Pronunciation, Punctuation and Phrase.

UNIT 2: Essentials of English Language [No. of Hours: 10]

Grammar: Parts of Speech- Tenses- Active and Passive Voice
Vocabulary: Idioms and Phrases- Antonyms- Synonyms- One word substitution

UNIT 3: Essential skills [No. of Hours: 10]

Sentence construction, how to develop a paragraph, Letter writing, Para phrasing, Content creation.

UNIT 4: Formal Writing [No. of Hours: 10]

Formal Writing: CV- Job Application- Importance and Purpose
Essentials of Career Skills: Group Discussion- Personality Development- Interviews

Text Books:

TB1. Business Communication by Rajendra Paul.
TB2. Business English, Pearson.

Reference Books:

RB1. Fluency in English- Part 2, Oxford University Press.
RB2. Language, Literacy and Creativity, Orient Black Swan.

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO#	Detailed statement of the CO
CO1	To understand communication skills and soft skills.
CO2	Use English Language effectively.
CO3	To be able to create job applications and CVs in an effective manner.
CO4	To apply the knowledge of Essential Skills in practical life.
CO5	To explain the importance of professional and ethical attitude at the workplace.
CO6	To develop essential professional skills among students.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2			2	3	1		3	3	3	2
CO2	2	3			2	3	1	2	3	2	3	2
CO3	1	3			3	3	1	2	3	3	3	2
CO4	2	2			3	3	1	2	3	3	3	2
CO5	1	3			2	3	1	2	3	2	3	3
CO6	2	2			2	2	1	2	3			
AVG	**1.7**	**2.5**			**2.3**	**2.8**	**1.0**	**2.0**	**3.0**	**2.6**	**3.0**	**2.2**

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCAP11				
Course Name : PROGRAMMING IN C LAB				
Semester /Year : Ist Semester				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To understand basic concepts of C programming, operators and expressions.
2. To learn the Concept of Various Decision Control statements and loops.
3. To understand the Concept of Arrays and String Operations.
4. To understand Concept of Functions, Pointers, Structure, Union and Enumeration.
5. To understand Concept of File Handling

COURSE CONTENTS

- Simple Program based on operators
- Simple Program based on Loops
- Program based on arrays
- Program based on strings
- Program based on function
- Program based on pointers
- Program based on structure & union
- Program based on File handling

Course Outcomes (CO):
After completion of the course, a student will be able to

CO#	Detailed Statement of the CO
CO1	Simple programs to understand & create the concepts of data types, operations and expressions.
CO2	By analyze and applying conditional and control statements.
CO3	Implementing Concept of array and String to solve problem.
CO4	Analyze and Implementation of functions, pointers, operation on pointers and dynamic storage allocation.

CO5	Defining, applying and handling structures, array of structures, union and processing data
CO6	To create a project using c programming language.

CO-PO Mapping:

CO	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	3	2	3	2	1					
CO2	2	2	3	2	3	1	2	1				
CO3	1	3	3	2	2	1	1	1			1	
CO4	1	2	3	2	2	1	2	1			1	
CO5	3	1	2	2	2	1	2	1				
CO6			1		2	2	3					
AVG	**1.5**	**1.5**	**2.5**	**1.6**	**2.3**	**1.3**	**1.8**	**0.6**			**0.3**	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCAP12				
Course Name : COMPUTER FUNDAMENTAL LAB				
Semester /Year : Ist Semester				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To provide understanding of the various components and functional units of computers, their design and working.
2. To provide insight into digital systems and logic circuit design.

COURSE CONTENTS

- Various Components of Computer
- Internal And External DOS Commands
- Windows Operating System
- MS Word
- MS Excel
- MS Power Point
- Web Browser and E-mail

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO#	Detailed Statement of the CO
CO1	Name, define, find, relate, show the basics of computer
CO2	Illustrate, outline, show, summarize word processing techniques
CO3	Implement or apply word processing using spread sheets
CO4	Analyze, compare examine the MS-Office techniques
CO5	Assess MS-office tools and techniques
CO6	Build, Design, develop new spreadsheets, PowerPoint presentation, word documents for give problem or case study

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2			1						
CO2	3	3	2	2								
CO3	3	3	2		1							

CO4	2	3	3									
CO5	3	3	3			2						
CO6	3	3	3	2	1	1						
AVG	**2.8**	**3**	**2,5**	**0.6**	**0.3**	**0.6**						

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:**	**BCA201**			
Course Name	**:**	**DATA STRUCTURE & FILE ORGANIZATION**			
Semester /Year	**:**	**IInd Semester**			
		L	**T**	**P**	**C**
		3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To learn basic knowledge about data structure and arrays.
2. To learn how to create and use linked list and its applications.
3. To learn the importance of static and dynamic use of stack and queues.
4. To learn the basic terminology of trees.
5. To learn basics of sorting and searching techniques

COURSE CONTENTS

UNIT I **[No. of Hours: 6]**

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off. Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered list, Sparse Matrices, and Vector.

UNIT II **[No. of Hours: 8]**

Link List: Representation and implementation of Singly linked lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT III **[No. of Hours: 8]**

Stacks: Array Representation and Implementation of stack, Operations and Stacks: Push and POP, Array Representation of Stack, Linked Representation of stack, Operations Associated with Stacks, Application of stack, Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes. Queues: Array and linked representation and implementation of queues, Operations on Queue; Create, Add, Delete, Full and Empty, Circular queue, Dequeue and Priority Queue.

UNIT IV **[No. of Hours: 10]**

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expressions, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Tree traversing, Threaded Binary tree, Huffman algorithm. Searching and Hashing: Sequential search, comparison and analysis, Hash Table, Hash Function, Collection Resolution Strategies, Hash Table Implementation.

UNIT V **[No. of Hours: 8]**

Sorting: Insertion Sort, Bubble sorting, Quick Sort, Two way Merge Sort, Trees: Binary Search (BST), Insertion and Deletion in BST.

Text Books:

TB7. Lipschutz, "Data Structure", TMH

Reference Books:

RB1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia

RB2. R. Kruseetal, "Data Structures and Program Design in C" Pearson Education

COURSEOUTCOMES(CO):

After completion of the course, a student will be able to

CO#	Detailed Statement of the CO
CO1	Able to understand& remember basics of C programming language and arrays & able to apply basic concepts of linked list & its types
CO2	Able to understand & apply basic concepts of stack and queues through array and linked list
CO3	To understand & apply the basic knowledge of Binary trees & its representation, traversing in BST, Threaded binary tree, Huffman algorithm etc.
CO4	Able to understand the concepts of sorting and searching & Hashing techniques.
CO5	Apply the basic knowledge of to implement File Structure
CO6	Create the structure of stack, queues, trees etc. using array and linked list.

CO-PO Mapping:

	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1		1							
CO2	2	2	1		1		1					
CO3	2	1	2		2		1					
CO4	2	1	1	1		1	1					
CO5	2	1		1		2	1					
CO6	2	2	2	2	2	1	1					
AVG	**2**	**1.3**	**1.4**	**1.3**	**1.5**	**1.3**	**1.0**					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCA202				
Course Name : CORE JAVA				
Semester /Year : IInd Semester				
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To learn why Java is useful for the design of desktop and web applications.
2. To learn how to implement object-oriented designs with Java.
3. To identify Java language components and how they work together in applications.
4. To design and program stand-alone Java applications.

COURSE CONTENT

Unit I **[No. of Hours: 8]**

Introduction to Java programming–Java Buzzword, The Java Virtual Machine, Variables and data types, Operators and Expressions- Introduction, Arithmetic Operators, Relational Operators Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversion and Associativity,

Unit II **[No. of Hours: 8]**

Decision Making and Branching- Introduction, Decision Making with if Statement, Simple if Statement, The if…..else Statement, Nesting of if .Else Statements, The else if Ladder, The Switch Statement, The ?: Operator. Decision Making and Looping – Introduction, while Statement, do Statement, for Statement, Jumps in Loops Labeled Loops

Unit III **[No. of Hours: 8]**

Classes, Objects and Methods- Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance- Types of inheritance single, multiple, multi-level, hierarchical, Interfaces, Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors- Arrays, One-dimensional Arrays, Creating an Array, Two -Dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, Wrapper Classes.

Unit IV **[No. of Hours: 8]**

Multithreaded Programming- Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface.Packages -

Using a Package, Adding a Class to a Package, Exceptions Handling - Introduction, Types of Exception Handling Code, Multiple Catch Statements, Using Finally Statement,

Unit V **[No. of Hours: 8]**

Applet Programming - Introduction, How Applets Differ from Applications, , Applet Life Cycle, Creating Applet Tag, Adding Applet to HTML File, running the Applet, Input/OutputFiles in JAVA:- Introduction, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Using the File Class

Text Books:

TB1. A. Balaguruswamy, "Programming with JAVA", A Primer, TMH, 1999.

Reference Books:

RB1. Thomas Boutel, "CGI programming in C and Perl", Addison – Wesley, 1996.
RB2. Jefry Dwight et al, Using CGI, Second Edition, Prentice Hall, India, 1997.
RB3. Patrick Naughton& Herbert Schildt, JAVA 2: The Complete Reference, THM, 1999.
RB4. Schildt, "JAVA The Complete Reference", 7th Edition.

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO#	Detailed Statement of the CO
CO1	Understand the object oriented concepts
CO2	Implement multi-threading programs
CO3	Implement Exception handling
CO4	Develop GUI based applications
CO5	Understand file handling
CO6	Design program based on files

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3					2						
CO2	2	2		1			2		2	2	1	
CO3	1		3		2	2						
CO4	2	2										
CO5	1			2								
CO6	1	1	2	2	2	2						
AVG	**2.0**	**0.83**	**0.83**	**0.83**	**0.66**	**1.0**	**0.4**		**0.4**	**0.4**	**0.2**	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**: BCAME203A**			
Course Name	**: COMPUTER ORGANIZATION & ARCHITECTURE**			
Semester	**: IInd Semester**			
	L	**T**	**P**	**C**
	3	**1**	**0**	**4**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To understand the structure, function and characteristics of computer systems.
2. To understand the design of the various functional units and components of computers.
3. To identify the elements of modern instructions sets and their impact on processor design.
4. To explain the function of each element of a memory hierarchy,
5. To identify and compare different methods for computer I/O.

Course Contents

Unit 1 **[No. of Hours: 10]**

Introduction to Computers- Basics of Computer, Von Neumann Architecture, Generation of Computer, Classification of Computers, Instruction Execution, Register Transfer and Micro operations- Register Transfer, Bus and Memory Transfers, Tree-State Bus Buffers, Memory Transfer, Micro-Operations, Register Transfer Micro-Operations, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations.

Unit 2 **[No. of Hours: 8]**

Computer Arithmetic - Addition and Subtraction with Signed-Magnitude, Multiplication Algorithm, Booth Multiplication Algorithm, Fixed Point and IEEE floating-point number representation.

Unit 3 **[No. of Hours: 8]**

Control Unit Organization – Hardwired and Microprogrammed Control Unit, CPU Organization- Types, Instruction Formats, Three - Address Instructions, Two – Address Instructions, One- Address Instructions, Zero Address Instructions, Addressing modes, CISC Characteristics vs. RISC Characteristics, Pipelining - Arithmetic Pipeline & Instruction Pipeline.

Unit 4 **[No. of Hours: 8]**

Memory Organization- Memory Hierarchy, Main Memory, Auxiliary Memory, Cache Memory, Virtual Memory. Address Space and Memory Space, Associative Memory, Page Table, Page Replacement.

Unit 5 **[No. of Hours: 6]**

Input-Output Organization- Modes of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPU-IOP Communication.

Text Books:

TB1. M. M. Mano, Computer System Architecture Digital Design, 3rd ed., Pearson Education, Delhi, 2007.

TB2. T. Radhakrishnan and V. Rajaraman – Computer Organization & Architecture, PHI, 2004.

Reference Books:

RB1. D.P. Leach, A. P. Malvino, Goutam Guha, Digital Principles and Applications, Tata Mc-Graw Hill, New Delhi, 2011.

RB2. R.J. Tocci and N.S. Widner, Digital Systems - Principles & Applications, PHI, 10th Ed., 2007

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO1	Outline the principles of computer design and understand the basic organization of computer and BUS architecture of the system.
CO2	Understand the digital representation of data in a computer system and performing arithmetic calculations on data.
CO3	Demonstrate the different types of control logic designs in processors, instruction set principles and instruction format.
CO4	Illustrate the effect of addressing modes on the execution time of a program.
CO5	Summarize the concepts of memory system, memory mapping. Evaluate the computer memory types based on performance and cost and interpret replacement algorithms.
CO6	Integrate the concepts of input/output organization, different communication schemes and data transfer modes.

CO-PO Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**

CO1	3	2	2	2	-	2	-	-	-	2	-	-
CO2	3	2	2	2	-	2	-	-	-	1	-	-
CO3	3	2	2	2	-	1	-	-	-	1	-	-
CO4	2	1	1	1	-	1	-	-	-	1	-	-
CO5	2	1	1	1	-	1	-	-	-	1	-	-
CO6	3	2	2	2	-	1	-	-	-	1	-	-
AVG	**2.7**	**1.7**	**1.7**	**1.7**	**0.0**	**1.3**	**0.0**	**0.0**	**0.0**	**1.2**	**0.0**	**0.0**

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code	**:**	**BCAME203B**			
Course Name	**:**	**INTRODUCTION TO LOGIC**			
Semester /Year	**:**	**IInd Semester**			
	L	**T**	**P**	**C**	
	3	**1**	**0**	**4**	

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. Understanding the nature of inferential reasoning, types of reasoning. Learning major vocabulary, analyzing the nature of arguments and the relation between truth and validity.
2. Understanding the importance of symbolic logic and symbolic representation of natural language to find out the logical features, learning to compose compound statements and arguments, analyzing the nature of truth-functional compound statements and determining their truth values.
3. To use truth-table method to test the validity-invalidity of arguments, understanding the formal nature of arguments and statements, their classification and determining the logical status of statement forms.
4. Understanding the rules of Inference and rules of replacement and applying them to prove the validity of the arguments, to use conditional proof as a tool to check the validity of the arguments. Also proving the invalidity of without using truth tables and formal proofs.
5. Understanding to employ reduction ad absurdum as method to assess the validity of the arguments and the status of the statements drawing insights from truth table technique.
6. Understanding how to symbolize statements that involve quantifiers, knowing the nature and function of quantifiers, the relation between propositions involving quantifiers according to the square of opposition and comparing it with the traditional square of opposition.
7. Understanding the nature of quantification rules and applying them to prove arguments involving quantifiers. Knowing to prove the invalidity of certain arguments by assigning truth-values.

COURSE CONTENT

UNIT 1 **[No. of Hours: 8]**

Introduction: logic, truth tables, equivalence, language to logic, applications to circuit design, exponential growth . Semantic tableaux , problem solving with semantic tableaux.

UNIT 2 **[No. of Hours: 8]**

Propositional logic: Syntax of propositional logic, rules of natural deduction, the sequent calculus.

UNIT 3 **[No. of Hours: 8]**

Predicate Logic : Introduction on First order predicate calculus.

UNIT 4 **[No. of Hours: 8]**

Resolution in propositional logic. Normal forms, Resolving arguments, Resolution, Combinatorial search problems.

UNIT 5 **[No. of Hours: 8]**

Resolution in Predicate Logic: Predicate Logic, quantifiers, Normal Forms, Herbrand Universes, Resolution, Unification, Problem solving using resolution

Text Books:

TB1. The Essence of Logic. John Kelly. Prentice-Hall International
TB2. Virginia Klenk, Understanding Symbolic Logic, 5/e, Pearson Education

Course Outcomes (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO
CO1	Define Logic and various Logic concepts and its application in Computer software development.
CO2	Classify, compare, explain use of propositional logic in knowledge representation and truth verification.
CO3	Make use of predicate logic in knowledge representation and truth verification.
CO4	Examine, simplify, test the use of resolution in propositional logic.
CO5	Deduct, explain, prove use of resolution in predicate logic.
CO6	Build, create, combine, estimate application of Logics in day to day life

Co-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3								
CO2	3	2		1								

CO3	3	2		1								
CO4	3	2		2								
CO5	3		3									
CO6				2								
AVG	**2.5**	**1.5**	**0.8**	**1.5**								

3 – Highest Correlated, 2 – Medium Correlated, 1 – Low Correlated

Course code	**: BCAOE204 (Minor/Open Elective)**			
Course Name	**: OFFICE AUTOMATION - II**			
Semester /Year	**: IInd Semester**			
L	**T**	**P**	**C**	
2	**0**	**0**	**2**	

L - Lecture T – Tutorial P – Practical C – Credit

Course Objective:

- Office tools course would enable the students in crafting power point presentations, Database using the Microsoft suite of office tools.
- To familiarize the students in preparation of databases and presentations with office automation tools.

COURSE CONTENTS

UNIT -I MS-POWER POINT [No. of Hours: 10]

Introduction to 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.

UNIT –II MS-ACCESS [No. of Hours: 10]

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.

Text Books:

TB1. Microsoft PowerPoint 2010 - Develop Computer Skills: Be Future Ready, by Bittu Kumar.
TB2. Mastering MS office by Bittu Kumar.

Course Outcomes (COs):

Upon successful completion of the course a student will be able to

CO#	Detailed Statement of the CO
CO1	Define, name various tools used in MS PowerPoint, MS Access
CO2	Compare, contrast, explain terms used in MS PowerPoint, MS Access
CO3	Apply MS PowerPoint, MS Access to create personalized presentations and databases.
CO4	List, analyze various animation, used in MS PowerPoint, tables used in MS Access
CO5	Explain various operations used in MS Access importing data from other databases etc.
CO6	Build MS PowerPoint, MS Access documents for various case studies,

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2		2	1	1	1				
CO2	2	1	2		2	1	1	1				
CO3	2	1	2		2	1	1	1				
CO4	2	1	2		2	1	1	1				
CO5	2	1	2		2	1	1	1				
CO6	2	2	2		2	1	1	1				
AVG	**2**	**1**	**2**		**2**	**1**	**1**	**1**				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCAVC205				
Course Name : CYBER SECURITY				
Semester /Year : IInd Semester				
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. Learn the foundations of Cyber Security and threat landscape.
2. To equip students with the technical knowledge and skills needed to protect and
3. defend against cyber threats.
4. To develop skills in students that can help them plan, implement, and monitor
5. cyber security mechanisms to ensure the protection of information technology assets.
6. To expose students to governance, regulatory, legal, economic, environmental,
7. social and ethical contexts of Cyber Security.
8. To expose students to responsible use of online Social media network.
9. To systematically educate the necessity to understand the impact of cybercrimes
10. and threats with solutions in a global and societal context.
11. To select suitable ethical principles and commit to professional responsibilities and human values and contribute value and wealth for the benefit of the society

COURSE CONTENTS

UNIT I Introduction to Cyber Security **[No. of Hours: 6]**

Defining Cyberspace and Overview of Computer and Web-technology, Architecture of cyberspace, Communication and web technology, Internet, World wide web, Advent of internet, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace, Concept of Cyber Security, Issues and challenges of Cyber Security.

UNIT II Cybercrime and Cyber law **[No. of Hours: 8]**

Classification of cybercrimes, Common cybercrimes - cybercrime targeting computers, cybercrime against woman and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks., Reporting of cybercrimes, Remedial and mitigation measures, Legal perspective of cybercrime, IT Act,2000 and its amendments, Cybercrime and offences, Organizations dealing with Cybercrime and Cyber Security in India, Case studies

UNIT III Social Media Overview and Security **[No. of Hours: 10]**

Introduction to Social networks. Types of Social media, Social media platforms, Social media monitoring, Hashtag, Viral content, Social media marketing, Social media privacy, Challenges, opportunities and pitfalls in online social network, Security issues related to social media, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices for the use of Social media, Case studies

UNIT IV E-Commerce and Digital Payments **[No. of Hours: 8]**

Electronic Commerce definition, Main components of E-Commerce, Elements of E-Commerce security, E-Commerce threats, E-Commerce security best practices, Introduction to digital payments, Components of digital payment and stake holders, Modes of digital payments- Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments, Digital payment related common frauds and preventive measures. RBI guidelines on digital payment and customer protection in unauthorized banking transactions. Relevant provisions of Payment settlement Act,2007.

UNIT V Digital Devices Security, Tools and Technologies for Cyber Security

[No. of Hours: 8]

End Point device and Mobile phone security, Password policy, Security patch management, Data backup, Downloading and management of third party software, Device security policy, Cyber Security best practices, Significance of host firewall and Ant-virus, Management of host firewall and Anti-virus, Wi-Fi security, Configuration of basic security policy and permissions.

Text Books:

TB1. Cyber Crime Impact in the New Millennium, by Marine R. C, Auther Press.
TB2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd.

Reference Books:

RB1. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform.
RB2. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
RB3. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
RB4. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
RB5. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

Course outcomes (COs):
After completion of the course, a student will be able to

CO#	Detailed Statement of the CO
CO1	Define a deeper understanding and familiarity with various types of cyberattacks, cybercrimes, vulnerabilities and remedies thereto.
CO2	Understand and evaluate existing legal framework and laws on Cyber Security.
CO3	Use the security aspects of social media platform and ethical aspects associated with use of social media.
CO4	Analyse and evaluate the digital payment system security and remedial measures against digital payment frauds.
CO5	Analyse and evaluate the Digital devices security and cyber security risks.
CO6	Create Cyber Security Practices and Configuration of basic security policies and permissions.

CO-PO Mapping:

	POI	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3		1	1	1	1				2	1	
CO2	2									2	1	
CO3	2	1			3	2				2	1	
CO4	2	1			1	2				2		
CO5	2									2	1	
CO6	2	1			1	1	1		1	1		
AVG	**2.2**	**1.0**	**1.0**	**1.0**	**1.5**	**1.5**	**1.0**		**1.0**	**1.8**	**1.0**	

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCACC206				
Course Name : COMMUNICATION SKILLS				
Semester /Year : IInd Semester				
	L	**T**	**P**	**C**
	2	**0**	**0**	**-**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objective:

1. Enhance the Employability and Career Skills of students
2. Orient the students towards grooming as a professional.
3. Make them Employable.
4. Develop their confidence and help them attend interviews successfully and achieve growth by acquiring professionalism as a habit.

COURSE CONTENTS

UNIT I **[No. of Hours: 05]**

Self-Introduction-organizing the material – Written communication -Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice— presenting the visuals effectively – 5-minute presentations

UNIT II **[No. of Hours: 10]**

Introduction to Group Discussion— Participating in group discussions – understanding group dynamics – brainstorming the topic -– questioning and clarifying –Group discussion strategies-activities to improve Group discussion skills

UNIT III **[No. of Hours: 05]**

Social etiquette, Interview etiquette – dress code – body language

UNIT IV **[No. of Hours: 10]**

Interview, types attending job interviews– telephone/online interview -one to one interview &panel interview –CV writing, Job application, FAQs related to job interviews

Text Books:

TB1. Effective Communication and soft skills Author Nitin Bhatnagar and Mamta Bhatnagar, publisher Pearson

TB2. Basic Communication skills for technology **Author**-Rutherford**, Publishe**r -Pearson Publication

TB3. Business Communication **Author** N Gupta, **Publisher** -Sathya Bhawna Publication

TB4. Comprehension and communication skills **Author**-Varinder Kumar. **Publisher** Kalyani

Reference Books:

RB1. English communication **Author** Amit Ganguly, **Publisher** -SBPD publication

RB2. The art and science of business communication fourth edition, **Author** -PD Chaturvedi Mukesh Chaturvedi**, Publisher** Pearson

Course outcomes (COs):

Upon successful completion of the course a student will be able to

CO#	Detailed Statement of the CO
CO 1	Associating knowledge, skills, and judgment with human communication that facilitate their ability to work.
CO 2	Categorizing the sub-skills of listening and speaking and be able to deliver effectively in the real time contexts.
CO 3	Imbibing the mechanics of writing professional testimonies and will help the students to construct effective paragraphs which benefit in a longer composition.
CO 4	Expressing the different forms of written communication techniques to make effective internal and external business correspondence.
CO 5	Displaying etiquette to work collaboratively with others considering various hindrances that occur and how to abolish them by being articulate and professional.
CO6	Apply the knowledge of communication to enhance employability skills

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2			2	3	1		3	3	3	2
CO2	2	3			2	3	1	2	3	2	3	2
CO3	1	3			3	3	1	2	3	3	3	2
CO4	2	2			3	3	1	2	3	3	3	2
CO5	1	3			2	3	1	2	3	2	3	3

CO6	2	2			2	2	1	2	3			
AVG	**1.7**	**2.5**			**2.3**	**2.8**	**1.0**	**2.0**	**3.0**	**2.6**	**3.0**	**2.2**

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCAP21				
Course Name : DATA STRUCTURE & FILE ORGANIZATION LAB				
Semester /Year : IInd Semester				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To learn how to design the algorithms to solve the programming problems.
2. To learn how to discriminate the usage of various structures in approaching the problem solution.
3. To learn how to use effective and efficient data structures in solving various Computer Engineering domain problems
4. To learn how to analyse the problems to apply suitable algorithm and data structure.
5. To learn how to use appropriate algorithmic strategy for better efficiency

COURSE CONTENTS

- Program based on arrays
- Program based on strings
- Program based on Link List & types of Link List
- Program based on stack
- Program based on Queues
- Program based on Trees
- Program based on different types of sorting

Course Outcomes (CO):

After completion of the course, a student will be able to

CO#	Detailed Statement of the CO

CO1	Analyze & understand the difference between linear and non linear DS &
CO2	Implement array & link list and its types
CO3	Understand and implement stack and queues using array and link list
CO4	Understand and implement BST, addition and deletion of nodes, Huffman algorithm etc.
CO5	To implement different sorting techniques like selection Bubble, insertion, merge quick sort etc.
CO6	To create the data using linked list.

CO-PO Mapping:

	POI	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	2	2				1					
CO2	3	1	2			1	1					
CO3	3	2	3	1	1	2	2					
CO4	1	1	3	1		2	2					
CO5	1	1	3	1		1	2					
CO6		2	3	1	1	2	3					
AVG	**1.6**	**1.6**	**2.6**	**0.6**	**0.3**	**1.3**	**1.8**					

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated

Course code : BCAP32				
Course Name : CORE JAVA LAB				
Semester /Year : IInd Semester				
	L	**T**	**P**	**C**
	0	**0**	**4**	**2**

L - Lecture T – Tutorial P – Practical C – Credit

Course Objectives: The objectives of this course are

1. To teach the students basics of JAVA programs and its execution.
2. To teach the students the differences between C++ and Java programming.
3. To make the students learn concepts like packages and interfaces.
4. To make the students understand threads.
5. To make the students understand the usage util package.
6. To teach the student, to develop java programs using inheritance and interfaces.
7. To understand exceptional handling, command line arguments and file handling

Course Outcomes (COs):

Upon successful completion of the course a student will be able to

CO#	**Detailed Statement of the CO**
CO1	Define basic data types and class objects and understand multithreading
CO2	Understand exception handling
CO3	Compare and contrast method overloading with method overriding
CO4	Implement event handling
CO5	Create java applet
CO6	Plan java applets

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3					2						
CO2		2		2			2	2				
CO3			2		1							
CO4				2								
CO5		2			2							
CO6	1	1	2			2						
AVG	**0.7**	**0.8**	**0.7**	**0.8**	**0.6**	**0.7**	**0.4**	**0.4**				

3: Highest Correlated, 2: Medium Correlated, 1: Lowest Correlated