

DEPARTMENT OF COMPUTER SCIENCE AND APPLICATIONS
SCHEME AND SYLLABUS OF EXAMINATION FOR
Bachelor (Honours/Honours with Research) of Computer Application
Duration 4 Years (8 Semesters)w.e.f. Academic Session 2023-24

Semester – I										
Course Code	Course Title	Credit	L : T :P: CH	Internal Marks		External Marks		Total Marks		
				Th	Pr	Th	Pr	Min	Max	
Major/Core Courses										
BCA23-CC101	Problem Solving through C	4	3 : 0 : 1 : 5	20	10	50	20	40	100	
BCA23-CC102	Foundations of Computer Science	4	3 : 0 : 1 : 5	20	10	50	20	40	100	
BCA23-CC103	Logical Organization of Computer	4	3 : 0 : 1 : 5	20	10	50	20	40	100	
Minor/Vocational Courses										
BCA23-M101	Discrete Structures in Computer Science	2	1 : 0 : 1 : 3	10	05	20	15	20	50	
Multidisciplinary Courses										
BCA23-MDC101	Fundamentals of Computer Science	3	2 : 0 : 1 : 4	15	05	35	20	30	75	
Ability Enhancement Courses										
	To be opted by student from the Central Pool	2	2 : 0 : 0 : 2	15	-	35	-	20	50	
Skill Enhancement Courses										
	To be opted by student from the Central Pool	3	2 : 0 : 1 : 4	15	05	35	20	30	75	
Value Added Courses										
B23-VAC-101	Human Values and Ethics	2	2 : 0 : 0 : 2	15	-	35	-	20	50	
Total		24	30					600		



BCA23-CC101 Problem Solving through C

Max. Marks: 100

Min. Pass Marks: 40

Internal Assessment Marks : 30 [Theory (20) + Practical (10)]

External End Term Exam Marks : 70 [Theory (50) + Practical (20)]

Time : Theory (3 Hours), Practical (3 Hours)

Credit: 4

Course Objectives:

1. To learn the basics of C program, data types and input/output statements.
2. To understand different types of operators, their hierarchies and also control statements of C.
3. To implement programs using arrays and strings.
4. To get familiar with advanced concepts like structures, union etc. in C language.

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Overview of C: History, Importance, Structure of C Program, Character Set, Constants and Variables, Identifiers and Keywords, Data Types, Assignment Statement, Symbolic Constant.

Input/output: Formatted I/O Function-, Input Functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz. printf(), putchar(), puts().

UNIT-II

Operators & Expression: Arithmetic, Relational, Logical, Bitwise, Unary, Assignment, Conditional Operators and Special Operators Operator Hierarchy;. Arithmetic Expressions, Evaluation of Arithmetic Expression, Type Casting and Conversion. Decision making with if statement, if-else statement, nested if statement, else-if ladder, switch and break statement, goto statement, Looping Statements: for, while, and do-while loop, jumps in loops.

UNIT-III

Arrays: One Dimensional arrays - Declaration, Initialization and Memory representation; Two Dimensional arrays -Declaration, Initialization and Memory representation.

Functions: definition, prototype, function call, passing arguments to a function: call by value; call by reference, recursive functions.

Strings: Declaration and Initialization, String I/O, Array of Strings, String Manipulation Functions: String Length, Copy, Compare, Concatenate etc., Search for a Substring.

UNIT-IV

Pointers in C: Declaring and initializing pointers, accessing address and value of variables using pointers; Pointers and Arrays.

User defined data types: Structures - Definition, Advantages of Structure, declaring structure variables, accessing structure members, Structure members initialization, Array of Structures; Unions - Union definition; difference between Structure and Union.

UNIT-V (PRACTICUM)

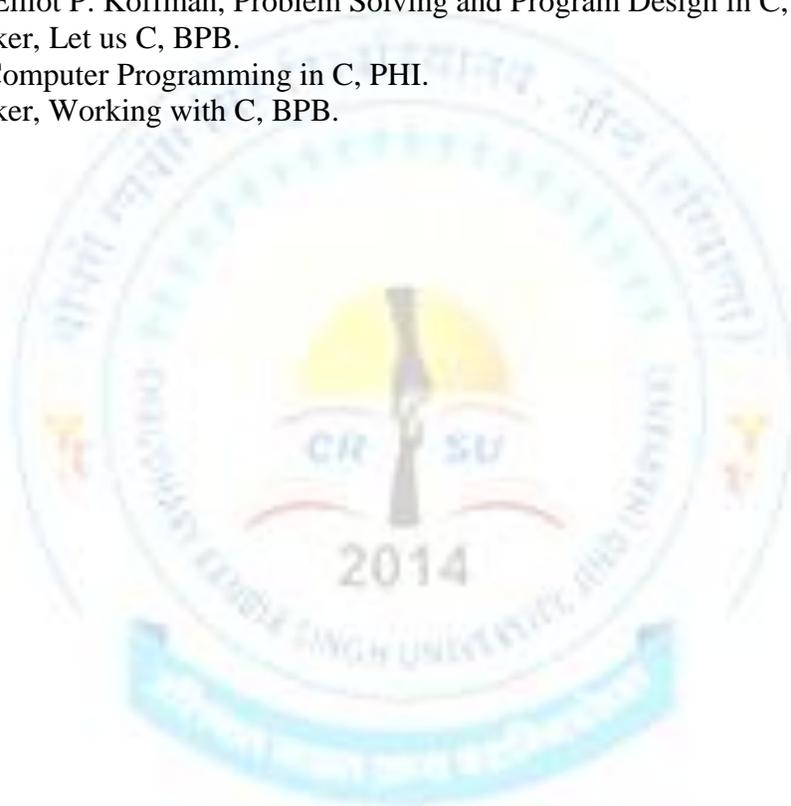
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution based on C Language during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill.
2. Balagurusamy, E., Programming in ANSI C, Tata McGraw-Hill.
3. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
4. Yashwant Kanetker, Let us C, BPB.
5. Rajaraman, V., Computer Programming in C, PHI.
6. Yashwant Kanetker, Working with C, BPB.



BCA23-CC102 Foundations of Computer Science

Max. Marks: 100

Min. Pass Marks: 40

Internal Assessment Marks : 30 [Theory (20) + Practical (10)]

External End Term Exam Marks : 70 [Theory (50) + Practical (20)]

Time : Theory (3 Hours), Practical (3 Hours)

Credit: 4

Course Objectives:

1. *To understand the basics of computer*
2. *To learn about I/O devices and operating systems*
3. *To understand internet and its services*
4. *To learn about the threats and security concepts on computers*

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Computer Fundamentals: Evolution of Computers through generations, Characteristics of Computers, Strengths and Limitations of Computers, Classification of Computers, Functional Components of a Computer System, Applications of computers in Various Fields. Types of Software: System software, Application software, Utility Software, Shareware, Freeware, Firmware, Free Software.

Memory Systems: Concept of bit, byte, word, nibble, storage locations and addresses, measuring units of storage capacity, access time, concept of memory hierarchy. Primary Memory - RAM, ROM, PROM, EPROM. Secondary Memory - Types of storage devices, Magnetic Tape, Hard Disk, Optical Disk, Flash Memory.

UNIT-II

I/O Devices: I/O Ports of a Desk Top Computer, Device Controller, Device Driver. Input Devices: classification and use, keyboard, pointing devices - mouse, touch pad and track ball, joystick, magnetic stripes, scanner, digital camera, and microphone Output Devices: speaker, monitor, printers: classification, laser, ink jet, dot-matrix. Plotter.

Introduction to Operating System: Definition, Functions, Features of Operating System, Icon, Folder, File, Start Button, Task Bar, Status Buttons, Folders, Shortcuts, Recycle Bin, Desktop, My Computer, My Documents, Windows Explorer, Control Panel.

UNIT-III

The Internet: Introduction to networks and internet, history, Internet, Intranet & Extranet, Working of Internet, Modes of Connecting to Internet.

Electronic Mail: Introduction, advantages and disadvantages, User Ids, Passwords, e-mail addresses, message components, message composition, mailer features. Browsers and search engines.

UNIT-IV

Threats: Physical & non-physical threats, Virus, Worm, Trojan, Spyware, Keyloggers, Rootkits, Adware, Cookies, Phishing, Hacking, Cracking.

Computer Security Fundamentals: Confidentiality, Integrity, Authentication, Non-Repudiation, Security Mechanisms, Security Awareness, Security Policy, anti-virus software & Firewalls, backup & recovery.

UNIT-V (PRACTICUM)

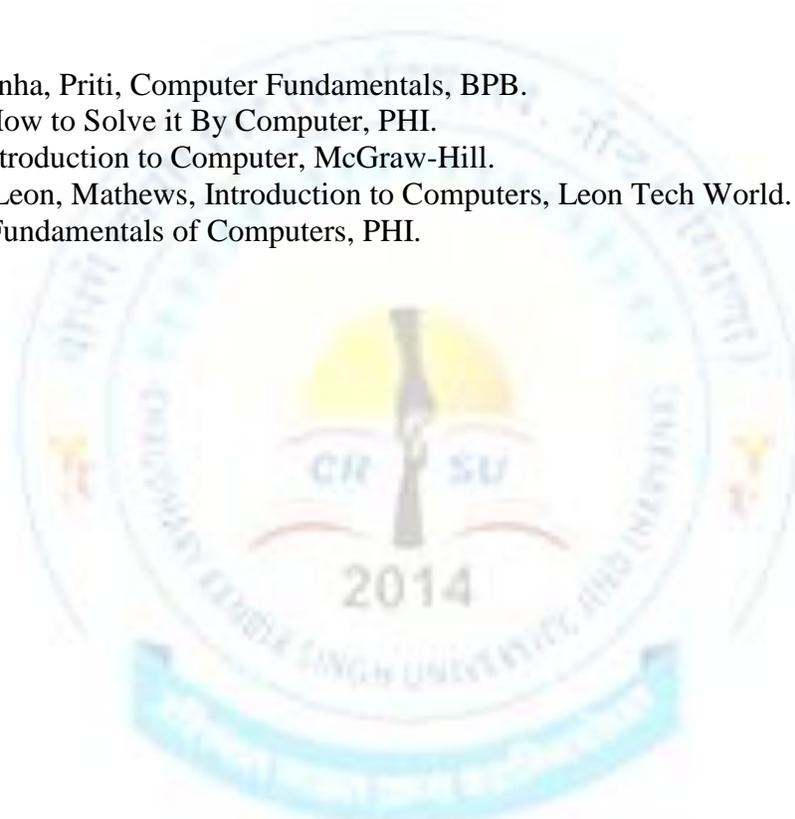
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB.
2. Dromey, R.G., How to Solve it By Computer, PHI.
3. Norton, Peter, Introduction to Computer, McGraw-Hill.
4. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World.
5. Rajaraman, V., Fundamentals of Computers, PHI.



BCA23-CC103 Logical Organization of Computer

Max. Marks: 100

Min. Pass Marks: 40

Internal Assessment Marks : 30 [Theory (20) + Practical (10)]

External End Term Exam Marks : 70 [Theory (50) + Practical (20)]

Time : Theory (3 Hours), Practical (3 Hours)

Credit: 4

Course Objectives:

1. To understand number systems, error detecting correcting code and representations of numbers in a computer system.
2. To understand computer arithmetic and Boolean algebra and simplification of Boolean expressions.
3. To understand working of logic gates and design various combinational circuits using these logic gates.
4. To understand working of different types of flip-flops and design different types of registers

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Number Systems: Binary, Octal, Hexadecimal etc. Conversions from one number system to another, BCD Number

System. BCD Codes: Natural Binary Code, Weighted Code, Self-Complimenting Code, Cyclic Code.

Error Detecting and Correcting Codes. Character representations: ASCII, EBCDIC and Unicode.

Number Representations: Integer numbers - sign-magnitude, 1's & 2's complement representation. Real Numbers normalized floating point representations.

UNIT-II

Binary Arithmetic: Binary Addition, Binary Subtraction, Binary Multiplication, Binary Division using 1's and 2's Complement representations, Addition and subtraction with BCD representations.

Boolean Algebra: Boolean Algebra Postulates, basic Boolean Theorems, Boolean Expressions, Boolean Functions, Truth Tables, Canonical Representation of Boolean Expressions: SOP and POS, Simplification of Boolean Expressions using Boolean Postulates & Theorems, Karnaugh-Maps (upto four variables), Handling Don't Care conditions.

UNIT-III

Logic Gates: Basic Logic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR etc. Their symbols, truth tables and Boolean expressions.

Combinational Circuits: Design Procedures, Half Adder, Full Adder, Half Subtractor, Full Subtractor, Multiplexers, Demultiplexers, Decoder, Encoder, Comparators, Code Converters.

UNIT-IV

Sequential Circuits: Basic Flip-Flops and their working. Synchronous and Asynchronous Flip-Flops, Triggering of Flip-Flops, Clocked RS, D Type, JK, T type and Master-Slave Flip-Flops. State Table, State Diagram and State Equations. Flip-flops characteristics & Excitation Tables. Sequential Circuits: Designing registers – Serial-In Serial-Out (SISO), Serial-In Parallel-Out (SIPO), Parallel-In Serial-Out (PISO) Parallel-In Parallel-Out (PIPO) and shift registers.

UNIT-V (PRACTICUM)

In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	5	5	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	5	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	10	-	
Total	20	10	

Suggested Readings:

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall.
3. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
4. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill.



BCA23-M101 Discrete Structures in Computer Science

Max. Marks: 50

Min. Pass Marks: 20

Internal Assessment Marks :15[Theory (10) + Practical (05)]

External End Term Exam Marks :35[Theory (20) + Practical (15)]

Time : Theory (3 Hours), Practical (3 Hours)

Credit: 2

Course Objectives:

1. To gain the knowledge of set theory, types of sets and operations on sets. Understand various concepts of matrices and determinants, and acquire the cognitive skills to apply different operations on matrices and determinants.
2. To have the knowledge of the basic concepts of complex numbers and acquire skills to solve linear quadratic equations.
3. To gain the knowledge of the concepts of Arithmetic progression, Geometric progression and Harmonic progression, and find A.M., G.M. and H.M. of given numbers.
4. To understand the concept of differentiation

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

An introduction to matrices and their types, Operations on matrices, Symmetric and skew-symmetric matrices, Minors, Co-factors. Determinant of a square matrix, Adjoint and inverse of a square matrix, Solutions of a system of linear equations up to order 3.

UNIT-II

Introduction to counting: Basic counting techniques – inclusion and exclusion, pigeon-hole principle, permutation, combination, summations. Introduction to recurrence relation and generating function.

UNIT-III

Introduction to Probability, Random Experiment, Random Variable, Random Example, Expected Value, Independent Variables, Dependent Variable, Bayes Theorem, Mutually Exclusive events, Complementary Events, Geometrical Probability, Probability with or without replacement.

Probability Distribution: Binomial Distribution, Poisson's Distribution, Geometric Distribution.

UNIT-IV

Introduction to Statistics: Central Tendency, Mean, Mode, Median, Dispersion;

Data Types and Data presentation: Data types: Attributes, Variable, Discrete and Continuous variable, Univariate and Bivariate distribution, Types of Characteristics, Different types of Scales: normal, ordinal, interval, and ratio.

Data presentation: Frequency distribution, Histogram, Ogive curves.

UNIT-V (PRACTICUM)

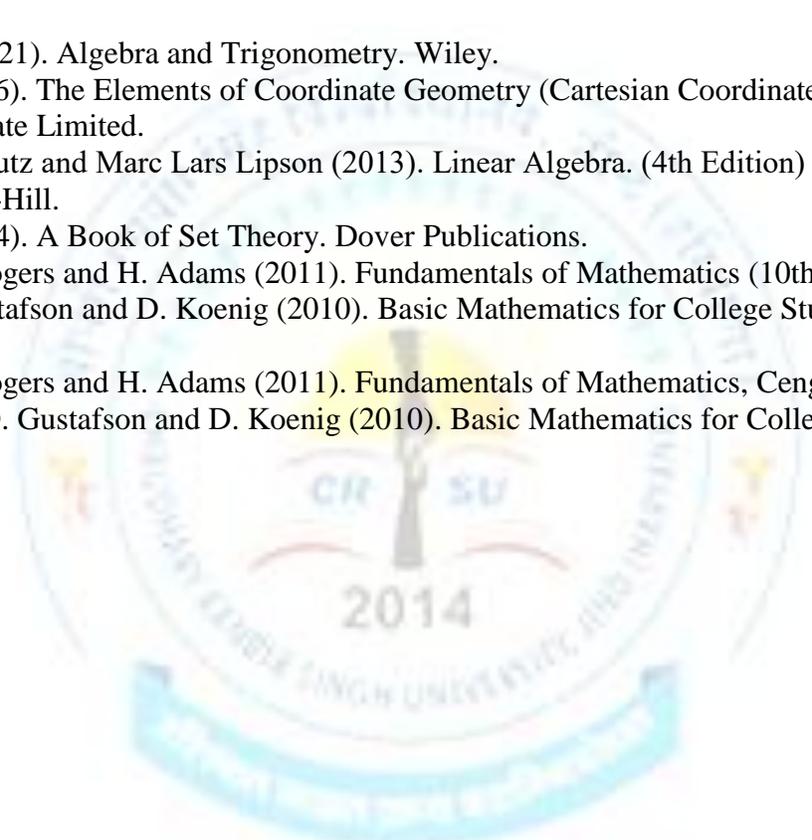
In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies execution in during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	4	-	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	-	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	5	
Mid-Term Exam	6	-	
Total	10	5	

Suggested Readings:

1. C. Y. Young (2021). Algebra and Trigonometry. Wiley.
2. S.L. Loney (2016). The Elements of Coordinate Geometry (Cartesian Coordinates)(2nd Edition). G.K. Publication Private Limited.
3. Seymour Lipschutz and Marc Lars Lipson (2013). Linear Algebra. (4th Edition) Schaum's Outline Series, McGraw-Hill.
4. C.C. Pinter (2014). A Book of Set Theory. Dover Publications.
5. J. V. Dyke, J. Rogers and H. Adams (2011). Fundamentals of Mathematics (10th Edition), Brooks/Cole.
6. A.Tussy, R. Gustafson and D. Koenig (2010). Basic Mathematics for College Students (4th Edition). Brooks Cole
7. J. V. Dyke, J. Rogers and H. Adams (2011). Fundamentals of Mathematics, Cengage Learning.
8. A.S. Tussy, R. D. Gustafson and D. Koenig (2010). Basic Mathematics for College Students. Brooks Cole.



BCA23-MDC101 Fundamentals of Computer Science

Max. Marks: 75

Min. Pass Marks: 30

Internal Assessment Marks : 20 [Theory (15) + Practical (05)]

External End Term Exam Marks : 55 [Theory (35) + Practical (20)]

Time : Theory (3 Hours), Practical (3 Hours)

Credit: 3

Course Objectives:

1. To understand the basics of computer
2. To learn about I/O devices and operating systems
3. To understand internet and its services
4. To learn about the threats and security concepts on computers

Examiner Note: Examiner will set a total of NINE questions. Out of which FIRST question will be compulsory and the remaining EIGHT questions will be set from four units selecting two questions from each unit. All questions will carry equal marks. First question will comprise of short answer type questions covering entire syllabus. Candidate will have to attempt FIVE questions in all, selecting one question from each unit. Examination will be of three-hour duration.

Practicum will be evaluated by an external and an internal examiner. Examination will be of three-hour duration.

UNIT-I

Computer Fundamentals: Evolution of Computers through generations, Characteristics of Computers, Strengths and Limitations of Computers, Classification of Computers, Functional Components of a Computer System, Applications of computers in Various Fields. Types of Software: System software, Application software, Utility Software.

UNIT-II

Memory Systems: Concept of bit, byte, word, nibble, storage locations and addresses, measuring units of storage capacity, access time, concept of memory hierarchy. Primary Memory - RAM, ROM, PROM, EPROM. Secondary Memory - Types of storage devices, Magnetic Tape, Hard Disk, Optical Disk, Flash Memory.

I/O Devices: I/O Ports of a Desk Top Computer, Device Controller, Device Driver. Input Devices: classification and use, keyboard, pointing devices - mouse, touch pad and track ball, joystick, magnetic stripes, scanner, digital camera, and microphone Output Devices: speaker, monitor, printers: classification, laser, ink jet, dot-matrix. Plotter.

UNIT-III

Introduction to Operating System: Definition, Functions, Features of Operating System, Icon, Folder, File, Start Button, Task Bar, Status Buttons, Folders, Shortcuts, Recycle Bin, Desktop, My Computer, My Documents, Windows Explorer, Control Panel.

UNIT-IV

The Internet: Introduction to networks and internet, history, Internet, Working of the Internet, Modes of Connecting to Internet.

Electronic Mail: Introduction, advantages and disadvantages, User Ids, Passwords, e-mail addresses, message components, message composition, mailer features. Browsers and search engines.

UNIT-V (PRACTICUM)

In practical component the teacher concerned / instructor will ensure minimum 15 programs / case studies during the laboratory work.

Suggested Evaluation Methods:

Internal Assessment:	Theory	Practicum	End Term Examination:
Class Participation	4	2	A three hour exam for both Theory and Practicum
Seminar/presentation/assignment/quiz/class test etc	4	-	
Seminar/Demonstration/Viva-voce/Lab records etc.:	-	3	
Mid-Term Exam	7	-	
Total	15	5	

Suggested Readings:

1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB.
2. Dromey, R.G., How to Solve it By Computer, PHI.
3. Norton, Peter, Introduction to Computer, McGraw-Hill.
4. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World.
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