ARYAVART INTERNATIONAL UNIVERSITY

Tilthai, Dharmanagar, North Tripura-799250

Syllabus for MCA

Semester 1

Theory									
Course Code	**Topic**	**L**	**T**	**P**	**Credit**	**Theory Marks**	**Internal Marks**	**Practical Marks**	**Total Marks**
24CS101	Fundamentals of IT	4	0	0	4	70	30	0	100
24CS102	C Programming	4	0	0	4	70	30	0	100
24MT101	Discrete Mathematical Structure	4	0	0	4	70	30	0	100
24CS302	Computer Organization and Architecture	4	0	0	4	70	30	0	100
24CM101	Accounting and Financial Management	4	0	0	4	70	30	0	100
24EN102	Business Communication	3	1	0	4	70	30	0	100
Practical									
24CS192	C Programming Lab	0	0	2	2	0	30	70	100
24CS193	Office Management Lab	0	0	2	2	0	30	70	100
	Total				**28**	**420**	**240**	**140**	**800**

ARYAVART INTERNATIONAL UNIVERSITY
Tilthai, Dharmanagar, North Tripura

Detailed Syllabus

FUNDAMENTALS OF IT

Code: 24CS101
Max Marks: 70

Course Objectives: The objective of the course is to understand basic computer hardware and software components, learn operating systems, networks, and data storage concepts, and develop skills in using common IT tools and applications.

UNIT I **(10 Hrs)**

Fundamentals of Computers: Definition and Characteristics of a Computer System. Computer Generation from First Generation to Fifth Generation. Classifications of Computers: Micro, Mini, Mainframe, and supercomputers.
Computer Hardware: Major Components of a digital computer, Block Diagram of a computer, Input-output devices, Description of Computer Input Units, Output Units, CPU.
Computer Memory: Memory Hierarchy, Primary Memory – RAM and its types, ROM and its types, Secondary Memory, Cache memory. Secondary Storage Devices - Hard Disk, Compact Disk, DVD, Flash memory.

UNIT II **(10 Hrs)**

Interaction with Computers: Computer Software: System software: Assemblers, Compilers, Interpreters, linkers, loaders.
Application Software: Introduction to MS Office (MS-Word, MS PowerPoint, MS-Excel).
Operating Systems: Elementary Operating System concepts, Different types of Operating Systems.
DOS: Booting sequence; Concepts of File and Directory, Types of DOS commands.
Computer Languages: Introduction to Low-Level Languages and High-Level Languages.

UNIT III **(10 Hrs)**

Computer Number System: Positional and Non-positional number systems, Binary, Decimal, Octal, and Hexadecimal Number Systems, and their inter-conversion.
Binary Arithmetic: Addition, subtraction, multiplication, and division. Use of the complement method to represent negative binary numbers, 1's complement, 2's complement, subtraction using 1's complement, and 2's complement. Introduction to Binary Coded Decimal (BCD), ASCII Codes, and EBCDIC Codes.

UNIT IV **(10 Hrs)**

Computer Network & Internet: Basic elements of a communication system, Data transmission modes, Data Transmission speed, Data transmission media, Digital and Analog Transmission, Network topologies, Network Types (LAN, WAN, and MAN), Basics of Internet and Intranet.
Internet: Terminologies related to Internet: Protocol, Domain name, Internet Connections, IP address, URL, World Wide Web. Introduction to Client-Server Model, Search Engine, Voice over Internet Protocol (VOIP), Repeater, Bridge, Hub, Switch, Router, Gateway, Firewall, Bluetooth technology.
Advanced Trends in IT Applications: Brief Introduction to Cloud Computing, Internet of Things, Data Analytics, AI, and Machine Learning.

Text Book:

1. P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 1992.
2. Anita Goel, "Computer Fundamentals", Pearson.

Reference Books:

1. B. Ram, "Computer Fundamentals, Architecture and Organization", New Age Intl.
2. Alex Leon & Mathews Leon, "Introduction to Computers", Vikas Publishing.
3. Norton Peter, "Introduction to Computers", 4th Ed., TMH, 2001.
4. Vikas Gupta, "Comdex Computer Kit", Wiley Dreamtech, Delhi, 2004.

ARYAVART INTERNATIONAL UNIVERSITY
Tilthai, Dharmanagar, North Tripura

C PROGRAMMING

Code: 24CS102
Max Marks: 70

Course Objectives: The objective of the course is to learn the syntax and structure of the C programming language, develop problem-solving and logic-building skills through coding, and write, compile, debug, and execute C programs.

UNIT I **(8 Hrs)**

Computer Programming: Basic Programming concepts, Modular programming and structured programming, Problem solving using Computers, Concept of flowcharts and algorithms.
Overview of C: Introduction, Importance of C, Sample C Programs, Basic structure of C programs, programming style, Executing a C Program.
Constants, Variables, and Data types: C Tokens, keywords, and identifiers, constants, variables, datatypes, declaration of variables, assigning values to variables, defining symbolic constants.
Operators and Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, increment and decrement operators, conditional operator, bitwise operators, type conversion in expressions, operator precedence, and associativity.
Mathematical functions.

UNIT II **(8 Hrs)**

Input and Output statements, reading a character, writing a character, formatted input, and formatted output statements.
Decision-making, Branching and Looping: 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, the GOTO statement, the WHILE statement, the DO statement, the FOR statement, and jumps in loops.

UNIT III **(8 Hrs)**

Arrays: One-dimensional array, Two-dimensional arrays, initializing arrays, Programs based on arrays, such as sorting, Fibonacci sequence, Matrix operations, etc.
Handling of Characters and Strings: Declaring and initializing string variables, reading a string from the terminal, writing a string to the screen, Arithmetic operations on characters, putting strings together. Comparison of two strings, Character and string handling functions.

UNIT IV **(8 Hrs)**

User-defined functions: Need for user-defined functions, A multi-functional program, the form of 'C' function, Return values and their types, Calling a function, Category of functions: No arguments and no return values, Arguments but no return values, Arguments with return values, Nesting of functions, Recursion, Functions with arrays as parameters.

UNIT V **(8 Hrs)**

Structure and Union: Structure definition, giving values to members, Structure initialization; Comparison of structure variables, Array of structures, Array within structure, Union.
Pointers: Understanding pointers, Accessing the address of variables, Declaring and initializing pointers, Accessing a variable through its pointer.

Text Book:

1. Kamthane, Programming with ANSI and Turbo C; Pearson Education, 2003

Reference Books:

1. E. Balaguruswamy. Programming in ANSI C", Tata McGraw-Hill (1998)
2. Yeshvant Kanetkar: "Let us C"
3. V. Rajaraman, "Programming in C", PHI (EEE) (2000)
4. Rajesh Hongal, "Computer Concepts & C language"
5. Brian Kernighan & Dennis M. Ritchie "ANSI C Programming" (PHI)

ARYAVART INTERNATIONAL UNIVERSITY
Tilthai, Dharmanagar, North Tripura

DISCRETE MATHEMATICAL STRUCTURE

Code: 24MT101
Max Marks: 70

Course Objectives: The objective of the course is to understand fundamental concepts like logic, sets, relations, and functions, apply mathematical reasoning and proof techniques, and use discrete structures in computer science applications.

UNIT I **(10 Hrs)**

SETS: Sets, Subsets, Equal Sets, Universal Sets, Finite and Infinite Sets, Operations on Sets: Union, Intersection, difference, and Complements of Sets, Algebra of sets, Cartesian product, Simple applications.

RELATION AND FUNCTIONS: Properties of Relations, Equivalence Relation, Partial Order Relation, Composition of relations and Representation of relations using digraph and Matrix, Function: Domain and Range, onto, into and One to One Functions, Composite and Inverse Functions, Hashing functions, Recursive function.

PROPOSITIONAL LOGIC: Introduction, Proposition, First-order logic, Basic logical operations, Truth tables, Tautologies, Contradictions, Algebra of Propositions, Logical implications, Logical equivalence, Predicates, Universal and existential quantifiers.

UNIT II **(10 Hrs)**

PARTIAL ORDER RELATIONS AND LATTICES: Partial Order Sets, Totally ordered set, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal elements, Greatest lower bound, least upper bound, Lattices and Algebraic Structure, Principle of Duality, Elementary Properties of Lattices, Atoms. Sub lattices, Bounded lattice, Distributed & Complemented Lattices, Isomorphic lattices. Boolean lattice.

UNIT III **(10 Hrs)**

COMBINATORICS: Introduction, Basic Counting Principles, Permutations, Permutations of things not all different, Circular Permutations, Combinations, Restricted Permutations and Combinations, Derangement, Pascal's Triangle, Binomial Theorem (only for natural Numbers).

RECURRENCE RELATIONS: Introduction, Order of Recurrence Relations, Degree of Recurrence Relations, Linear Homogeneous Recurrence Relations, Non-Homogeneous Recurrence Relations, Solution of linear homogeneous and non-homogeneous recurrence relations.

UNIT IV **(10 Hrs)**

GRAPHS: Introduction, Degree of a vertex of a graph, Handshaking Theorem, Types of Graphs, Subgraph, Matrix representation of a graph: adjacent and incidence matrices, Isomorphic graphs, Path and circuit (Floyd's and Warshall algorithms), Connected graph, Hamiltonian graph, Euler graph, Graph colouring (Vertex, Edges and Map).

Text Book:

1. Rosen, K.H., Discrete Mathematics and its Applications, McGraw-Hill Education, 8th edition, 2021
2. Kolman, Busby and Ross, "Discrete Mathematical Structures", Pearson, 10th edition, 2015
3. Babu Ram, "Discrete Mathematics", Pearson Education, 1st edition 2010

Reference Books:

1. D. S. Malik, M. K. Sen, "Discrete Mathematics" Cengage Learning, 2012
2. RB2. S.K. Sarkar "A Text Book of Discrete Mathematics" S. Chand Publications, 9th edition 2019
3. RB3. Singh J. P. "Discrete Mathematics for Undergraduates" ANE Books, 1st edition, 2013
4. RB4. Tremblay, J.P. and Manohar, R., "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-Hill

ARYAVART INTERNATIONAL UNIVERSITY
Tilthai, Dharmanagar, North Tripura

COMPUTER ORGANIZATION AND ARCHITECTURE

Code: 24CS302
Max Marks: 70

Course Objectives: The objective of the course is to learn the structure and functioning of computer hardware, understand instruction sets, memory hierarchy, and CPU organization, and analyse performance and system-level operations.

UNIT I **(10 Hrs)**
Boolean Algebra and Logic: Basics, Laws of Boolean Algebra, Logic Gates, Simplifications of Boolean equations using K-maps SOP and POS, Don't Care condition.
Arithmetic Circuits: Adder, Subtractor, Parallel binary adder/Subtractor.

UNIT II **(10 Hrs)**
Combinational Circuits: Multiplexers, De-Multiplexers, Decoders, Encoders.
Flip-flops: S-R, D, J-K, T, Clocked Flip-flop, Race around condition, Master slave Flip-Flop, Realisation of one flip-flop using other flip-flop, Applications of flip-flop: Latch, Registers, Counters (elementary treatment to be given).

UNIT III **(10 Hrs)**
Data Transfer Operations: Register Transfer, Bus and Memory Transfer, Registers and micro-operations.
Basic Computer Organizations and Design: Instruction Codes, Computer Registers, Instruction Cycle, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes.

UNIT IV **(10 Hrs)**
Input-Output Organization: Peripheral Devices, Input-Output Interfaces, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA).
Memory Organization: Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Textbook:

1. Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of India Private Limited, 1999.
2. Morris Mano, "Digital Logic and Computer Design", PHI Publications, 2002

Reference Books:

1. R. P. Jain, "Modern Digital Electronics", TMH, 3rd Edition, 2003.
2. William Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001
3. Subrata Ghosal," Computer Architecture and Organization", Pearson, 2011
4. Malvino, "Digital Computer Electronics: An Introduction to Microcomputers", McGraw-Hill.

ARYAVART INTERNATIONAL UNIVERSITY
Tilthai, Dharmanagar, North Tripura

ACCOUNTING AND FINANCIAL MANAGEMENT

Code: 24CM101
Max Marks: 70

Course Objectives: The objective of the course is to understand basic accounting principles and financial statements, analyse financial data for decision-making and learn budgeting, costing, and financial planning concepts.

UNIT I **(08 Hrs)**
Introduction – Principles – Concepts & Conventions – Double entry system of accounting – Journal – Ledger. Preparation of trial balance. Subsidiary Books with special reference to simple cash book and three column cash books.

UNIT II **(08 Hrs)**
Final accounts of sole trader: Adjusting entries, Including reserve for bad debts, Reserve for discount on debtors and creditors, Preparation of final accounts.

UNIT III **(08 Hrs)**
Introduction – Meaning, Scope, Functions of finance manager. Unit Costing: Preparation of cost sheet.

UNIT IV **(08 Hrs)**
Ratio analysis: Meaning of ratio – Advantages – disadvantages – types of ratio – usefulness – liquidity ratios – profitability ratios, Efficiency ratios, Solvency ratios. (Theoretical concepts) Funds Flow Statement: Meaning – concepts of funds flow. Cash flow statement: Meaning, Need – Simple problems on cash flow statement.

UNIT V **(08 Hrs)**
Marginal Costing: Meaning – Definition – Concepts in marginal costing – Marginal equations – P / V ratio – B.E.P – Margin of safety – Sales to earn a desired profit – Problems on above Budgetary control: Meaning – Definition – Preparation of flexible budget and cash budget.

Textbook:

1. Financial Accounting, Ashis Bhattacharya, Prentice-Hall India Publication.
2. Prasanna Chandra, Financial Management, Tata McGraw-Hill Publications

Reference Books:

1. "Book Keeping and Accountancy" Choudhari, Chopde.
2. "Cost Accounting": Choudhari, Chopde.
3. "Financial Management" Text and Problems: M.Y.Khan, P.K. Jain.
4. "Financial Management Theory & Practice" Prasanna Chandra Tata McGraw-Hill.
5. Managerial Economics & Financial Analysis, Siddiqui S.A. Siddiqui A.S. New Age.

ARYAVART INTERNATIONAL UNIVERSITY
Tilthai, Dharmanagar, North Tripura

BUSINESS COMMUNICATION

Code: 24EN102
Max Marks: 70

Course Objectives: The objective of the course is to develop effective verbal and written communication skills, understand professional communication in business settings, and improve interpersonal and presentation skills.

UNIT I **(10 Hrs)**

Concepts and Fundamentals: Introduction to Technical Communication, Need and importance of communication, Channel, Distinction between general and technical communication, Nature and features of technical communication, Seven Cs of communication, Types of Technical communication, Style in technical communication, Technical communication skills, Language as a tool of Communication, History of development of Technical Communication, Computer-Aided Technical Communication

UNIT II **(10 Hrs)**

Oral Communication: Principles of effective oral communication, Introduction of Self and others, Greetings, Handling Telephone Calls, Interviews: Meaning & Purpose, Art of interviewing, Types of interview, Interview styles, Essential, Techniques of interviewing, Guidelines for Interviewer, Guidelines for interviewee. Meetings: Definition, Kind of meetings, Agenda, Minutes of the Meeting, Advantages and disadvantages of meetings/ committees, Planning and organization of meetings. Project Presentations: Advantages & Disadvantages, Executive Summary, Charts, Distribution of time (presentation, questions & answers, summing up), Visual presentation, Guidelines for using visual aids, Electronic media (power-point presentation). The technique of conducting Group Discussion and JAM session.

UNIT III **(10 Hrs)**

Written Communication: Overview of Technical Writing: Definition and Nature of Technical Writing, Basic Principles of Technical Writing, Styles in Technical Writing.
Note – Making, Notice, E-mail Writing.
Writing Letters: Business letters, Persuasive letters- Sales letters and complaint letters, Office memorandum, Good news and bad news letters.
Report Writing: Definition & importance; categories of reports, Elements of a formal report, style and formatting in report.
Special Technical Documents Writing: Project synopsis and report writing, Scientific Article and Research Paper writing, Dissertation writing: Features, Preparation and Elements.
Proposal Writing: Purpose, Types, characteristics and structure.
Job Application: Types of application, Form & Content of an application, Drafting the application, Preparation of resume.

UNIT IV **(10 Hrs)**

Soft Skills: Business Etiquettes – Professional Personality, Workplace Protocols, Cubicle. Non-Verbal Communication: Kinesics and Proxemics, Paralanguage.
Interpersonal Skills.
Language Skills: Improving command in English, improving vocabulary, Choice of words, Common problems with verbs, Adjectives, adverbs, Pronouns, Tenses, Conjunctions, punctuation, prefixes, suffixes, and Idiomatic use of prepositions. Sentences and paragraph construction, improve spellings, Common errors and misappropriation, Building advanced Vocabulary (Synonyms, Antonyms), Introduction to Business English.

Text Book:

1. Kavita Tyagi and Padma Misra, "Advanced Technical Communication", PHI, 2011
2. P. D. Chaturvedi and Mukesh Chaturvedi, "Business Communication – Concepts, Cases and Applications", Pearson, second edition.
3. Rayudu, "C. S- Communication", Himalaya Publishing House, 1994.
4. Asha Kaul, "Business Communication", PHI, second edition.

Reference Books:

1. Raymond Murphy, "Essential English Grammar- A self-study reference and practice book for elementary students of English", Cambridge University Press, second edition.
2. Manalo, E. & Fermin, V. (2007). Technical and Report Writing. ECC Graphics. Quezon City.
3. Kavita Tyagi and Padma Misra, "Basic Technical Communication", PHI, 2011.
4. Herta A Murphy, Herbert W Hildebrandt, and Jane P Thomas, "Effective Business Communication", McGraw-Hill, seventh edition.

C PROGRAMMING LAB

Code: 24CS192
Max Marks: 70

(BASED ON 24CS102) C Programming:
Core Practical (Implement a minimum of 8 out of 10 practical)

1. Write a program to convert temperature from Celsius to Fahrenheit by taking input from the user.
2. Write a program to find the greatest number among 3 numbers given by the user.
3. Write a program to check if a given number is a prime number or not.
4. Write a program to display the following pattern up to N rows, taking the value of N from the user:

```
1
2     3
4     5     6
7     8     9     10
```

5. Write a program to input the marks of 50 students using an array and display the average marks of the class.
6. Write a program to search for a number entered by the user in a given array and display the array in ascending order.
7. Write a program to check if a string is a palindrome or not.
8. Write a program to add, subtract, multiply, and divide two numbers using pointers.
9. Write a program to create a structure for employees containing the following data members: Employee ID, Employee Name, Age, Address, Department, and Salary. Input data for 10 employees and display the details of the employee from the employee ID given by the user.
10. Write a program to create two files with names EvenFile and OddFile. Input 20 numbers from the user and save even numbers in EvenFile and odd numbers in OddFile.

Application Based Practical (Implement minimum 5 out of 10 practical)

11. Write a menu driven program to construct a calculator for following arithmetic operations: addition, subtraction, multiplication, division, average and percentage.
12. Write a menu driven program to perform the following operations:
    (i) Print Armstrong numbers up to N,
    (ii) Display prime numbers between 1 to N,
    (iii) Reverse of an integer
13. Write a program to convert a hexadecimal number into a binary number.
14. Write a program to calculate factorial of a number and display fibonacci series upto N terms using recursive functions.
15. Write a program to perform
    (i) matrix addition,
    (ii) matrix multiplication, and
    (iii) Matrix transpose on 2D arrays.
16. Write a program to make use of arrays with structures in the following ways:
    (i) Use array as a structure data member
    (ii) Create array of structure variables
17. Write a program to compare the contents of two files by taking names of the files through command line arguments.
18. WAP to perform I/O and make use of file positioning functions on Binary files. (using fseek, ftell, rewind functions)

19. Write a menu driven program to implement the following string operations:
    (i) Calculate length of a string
    (ii) Concatenate at the end of a given
    (iii) Copy one string to another
    (iv) Compare contents of two strings
    (v) Copy nth character string to another
20. Write a program to read time in string format and extract hours, minutes and second also check time validity

Note:

1. **In total, 15 practicals to be implemented. 2 additional practicals may be given by the course instructor.**
2. **This is a suggestive list of programs. However, the instructor may add programs as per the requirements of the course.**

OFFICE MANAGEMENT LAB

Code: 24CS192
Max Marks: 70

MS Word Basics: Introduction to MS Word; Features & area of use. Working with MS Word. Menus & Commands, Toolbars & Buttons, Shortcut Menus, Wizards & Templates. Creating a New Document, Different Page Views and Layouts, and Applying Various Text Enhancements. Working with - Styles, Text Attributes, Paragraph and Page Formatting; Text Editing using various features; Bullets, Numbering, Auto formatting, Printing & various print options. Advanced Features of MS-Word: Spell Check, Thesaurus, Find & Replace; Headers & Footers Inserting - Page Numbers, Pictures, Files, Auto texts, Symbols etc., Working with Columns, Tabs &indents; Creation & Working with Tables including conversion to and from text; Margins & Space management in Document; Adding References and Graphics; Mail Merge, Envelops & Mailing Labels.

MS Excel: Introduction and area of use; Working with MS Excel., concepts of Workbook & Worksheets; Using Wizards; Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; Working with Data & Ranges; Different Views of Worksheets; Column Freezing, Labels, Hiding, Splitting etc.; Using different features with Data and Text; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Working with Different Chart Types; Printing of Workbook & Worksheets with various options

MS PowerPoint: Introduction & area of use; Working with MS PowerPoint; Creating a New Presentation; Working with Presentation; Using Wizards; Slides & its different views; Inserting, Deleting and Copying of Slides; Working with Notes, Handouts, Columns & Lists; Adding Graphics, Sounds and Movies to a Slide; Working with PowerPoint Objects; Designing & Presentation of a Slide Show; Printing Presentations

MS Access: Define data needs and types, define and print table relationships, add, set, change, or remove primary keys. Split databases, create databases, create tables, modify tables, enter records using datasheet view, delete records from a table, Change records in a table, create fields and modify field properties, create reports, modify the design of reports and forms.

Computerized Accounting: Use of Accounting Software Tally, Creation Company, Voucher Entry, Types of accounts, Mode of accounting (Day cash book, ledger book, bank reconciliation, Ledgers, Trial balance, Balance Sheet), Analysis of Trial Balance and Final Accounts

ARYAVART INTERNATIONAL UNIVERSITY
Tilthai, Dharmanagar, North Tripura

Theory Paper

Total: 100 Marks
External: 70 Marks
Internal: 30 Marks

External: 70 Marks
10 Question (MCQ): 1 mark each (1x10 = 10)
Answer any 6 out of 8 (Very Short 20-30 Words): 2 marks each (2x6 = 12)
Answer any 6 out of 8 (Short 50-70 Words): 3 marks each (3x6 = 18)
Answer any 6 out of 8 (Long 100-120 Words): 5 marks each (5x6 = 30)

Internal: 30 Marks
Two Internal Assessment Examinations will be conducted, each carrying 50 marks. The average of the two scores will be considered and scaled to 15 marks for the final assessment. Additionally, 5 marks will be allotted for assignments submitted, 5 marks for attendance, and 5 marks for general proficiency, totalling 15 internal assessment marks.

Lab

Practical: 100 Marks
External: 70 Marks
Internal:30 Marks

External (Two programs): 70 Marks
- **Program Writing**: 10 + 10 Marks
- **Algorithm & Flowchart**: 5 + 5 Marks
- **Program Execution**: 15 + 15 Marks
- **Viva**: 10 Marks

Internal Assessment (30 Marks)
Internal Assessment Examinations will be conducted, carrying 50 marks
- **Record**: 5 Marks
- **Attendance**: 5 Marks
- **Program Writing**: 15 Marks
- **Program Execution**: 15 Marks
- **Viva**: 10 Marks

.