MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(Deemed to be University)
(Declared Under Distinct Category by Ministry of Education, Government of India)
NAAC Accredited with A++ Grade

Syllabi of
Departmental Courses (DC) Courses
B. Tech I Semester
For batch admitted 2025-26
(Computer Science and Engineering)

Emerging Technologies in Computer Science
15251101

Course Objectives:

- To acquire knowledge of trending and emerging technologies along with their principles, issues, challenges, and mechanisms.
- To provide a conceptual understanding of modern tools and techniques for Big data Analytics, Artificial intelligence, Cyber Security, and IoT.

Unit I – Artificial Intelligence:

Introduction: Need and Scope of AI, History, Definition of AI, Techniques of AI, Characteristics of AI applications, Basic Search Techniques, General problem solving, Speech Recognition, Natural Language Processing, Computer Vision, Introduction of expert systems

Unit II – Cloud Computing:

Introduction to cloud computing, Software as a service, platform as a service, and infrastructure as a service. Cloud deployment model: Public cloud, Private clouds, Community clouds and Hybrid clouds. Virtualization: Compute virtualization, Storage virtualization, Full and paravirtualization. Introduction to Fog/ Edge Computing.

Unit III – Block Chain:

Growth of blockchain technology, Distributed systems, History of blockchain and Bitcoin, Types of blockchain. Block chain Architecture, Versions, Variants, Use cases, Life use cases of blockchain, Blockchain vs Distributed Database.

Unit IV – Internet of Things:

IoT definition, Characteristics, IoT conceptual and architectural framework, Components of IoT ecosystems, Review of Basic Microcontrollers and interfacing, Basic components and challenges of a sensor, Sensor features, RFID: Features & working principle.

Unit V - Big Data Analytics:

Introduction to Big data, Big data characteristics, Traditional data versus Big data, Evolution of Big data, challenges with Big Data, Technologies available for Big Data, Use of Data Analytics, Hadoop Ecosystem, Core Hadoop components, ETL Processing

COURSE OUTCOMES:

After successful completion of the course, the learners would be able to:

CO1 **Illustrate** concepts & applications of Artificial Intelligence.

CO2 **Describe** the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability benefits, as well as current and future challenges;

CO3 **Understand** the basics of block chain Technology

CO4 **Describe** the Internet of Things and its hardware and software components.

CO5 **Define** the concept and challenges of Big Data, along with the basic understanding of Big Data Solutions using the Hadoop Eco Syste

Reference Books:-

- RadhaShankarmani, M. Vijaylakshmi, " Big Data Analytics", Wiley, Second edition
- Rich & Knight - Artificial Intelligence
- Kai Hawang, Geoferrey C Fox, "Distributed and Cloud Computing"
- Cryptography and Network Security Principles and Practice Fourth Edition, William Stallings, Pearson Education
- Cuno Pfister, "Getting Started with the Internet of Things", O Reilly Media

Course Articulation Matrix

CO	PO													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		3	3	2									2
CO2	3					2	2				1	1	2	
CO3	3	2					2					1	1	
CO4			3		3	1						1	2	
CO5	3	2		1			2			1		2		2

1 - Slightly; 2 - Moderately; 3 – Substantially

COMPUTER PROGRAMMING
15251102

COURSE OBJECTIVES

- To develop the understanding of algorithms, programming approaches and program documentation techniques.
- To design and implement programming solutions for problem solving.

Unit I

Introduction to Programming, Machine Level Languages, Assembly Level Languages, High Level Languages, Program Execution and Translation Process, Problem solving using Algorithms and Flowcharts. Introduction to C Programming: Data Types, Constants, Keywords, Operators & Expressions, Precedence of operators and input/output functions.

Unit II

Control Statements and Decision Making: The goto statement, the if- else statement, Nesting of if statements, The conditional expression, The switch statement, The loop, The nesting of for loops, The break and continue statement.

Unit III

Arrays, Strings & Pointers: One dimensional Arrays, Passing Arrays to Functions, Multidimensional Arrays, Strings, Basics of Pointers & Addresses, Pointer to Pointer, Pointer to Array, Array of Pointers, Types of pointers, Pointer to Strings.

Unit IV

Structures & Union, Dynamic memory allocation, Storage Classes.

File Handling: Defining and opening a file, Closing Files, Input/output Operations on Files, Predefined Streams, Error Handling during I/O Operations, Command Line Arguments.

Unit V

Basics of graphics libraries (SFML, SDL, OpenGL), Event-driven programming and game loops. Using C++ for performance-critical parts of ML/DL applications. Interfacing with system APIs (Linux syscalls, Windows API). GitHub.

RECOMMENDED BOOKS

- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
- Paul Deitel and Harvey M. Deitel , How to Program, Pearson Publication.
- Yashavant Kanetkar , Let Us C, BPB publication.
- E. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill.
- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

COURSE OUTCOMES

After completion of the course students will be able to:

CO1: Understand different programming paradigms and the role of translators in program execution.

CO2: To use the goto, if-else, switch, break, and continue statements effectively.

CO3: Implement and manipulate arrays, strings, and pointers in C programs. Use one-dimensional and multi-dimensional arrays,

CO4: Understand and use of recursion, structures, unions, storage classes, and dynamic memory allocation for efficient program design.

CO5: Demonstrate the ability to handle file input/output operations. Use command-line arguments, predefined streams, and error handling mechanisms.

Course Articulation Matrix

CO	PO													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2					2	1	1	2	2
CO2	3	2	2	2	2					2	1	1	2	2
CO3	3	3	3	2	2					2	1	1	2	2
CO4	3	3	3	2	2					2	1	1		3
CO5	3	2	3	2	2	1	1	1	1	2	1	1	2	2

1 - Slightly; 2 - Moderately; 3 – Substantially

COMPUTER PROGRAMMING

15241102(OLD)

COURSE OBJECTIVES

- To develop the understanding of algorithms, programming approaches and program documentation techniques.
- To design and implement programming solutions for problem solving.

Unit I

Introduction to Programming, Machine Level Languages, Assembly Level Languages, High Level Languages, Program Execution and Translation Process, Problem solving using Algorithms and Flowcharts. Introduction to C Programming: Data Types, Constants, Keywords, Operators & Expressions, Precedence of operators and input/output functions.

Unit II

Control Statements and Decision Making: The goto statement, The if statement, The if- else statement, Nesting of if statements, The conditional expression, The switch statement, The while loop, The do…while loop, The for loop, The nesting of for loops, The break and continue statement.

Unit III

Arrays, Strings & Pointers: One dimensional Arrays, Passing Arrays to Functions, Multidimensional Arrays, Strings, Basics of Pointers & Addresses, Pointer to Pointer, Pointer to Array, Array of Pointers, Types of pointers, Pointer to Strings.

Unit IV

Functions & Structures: Function Basics, Function Prototypes, Passing Parameter by value and by reference, Passing string to function, Passing array to function, Function returning address, Recursion, Structures & Union, Pointer to Structure, Self-Referential Structures, Dynamic memory allocation by malloc/calloc function, Storage Classes.

Unit V

File Handling: Defining and Opening a file, Closing Files, Input/output Operations on Files, Predefined Streams, Error Handling during I/O Operations, Command Line Arguments.

RECOMMENDED BOOKS

- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

- Paul Deitel and Harvey M. Deitel , How to Program, Pearson Publication.
- Yashavant Kanetkar , Let Us C, BPB publication.
- E. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill.
- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.

COURSE OUTCOMES

After completion of the course students will be able to:

CO1: **Identify** situations where computational methods and computers would be useful.

CO2: **Describe** the basic principles of procedural programming.

CO3: **Develop** algorithms and flowchart for a given problem.

CO4: **Analyze** the problems and choose suitable programming techniques to develop solutions.

CO5: **Design** computer programs to solve real world problems.

Course Articulation Matrix

CO	PO													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1		3	3			1	2					2	2	
CO2	3	1	2									1	1	
CO3		3	3	2					2		1	1		2
CO4		3	3						2	1	1			3
CO5		2	3	2		3	2		1		1		2	

1 - Slightly; 2 - Moderately; 3 – Substantially

Digital Electronics
15251103

Course Objectives:

- To learn various number systems, logic gates and boolean algebra.
- To perform the analysis and design of various digital electronic circuits.
- To understand the concept of flip-flops, counters, and registers.

Unit I:
Introduction to Digital Electronics, Needs and Significance, Different Number Systems: Binary Numbers, Octal and Hexadecimal Numbers, Conversions, Complement's, Signed Binary Numbers, Binary Arithmetic, Binary Codes: BCD, ASCII Codes.

Unit II:
Digital Logic Gates, De Morgan's Theorem, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations, Karnaugh Maps and simplification/minimization, Prime Implicants and its types.

Unit III:
Combinational Circuits, Half Adder, Half Subtractor, Full Adder and Full Subtractor, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers, Demultiplexer.

Unit IV:
Sequential Circuits, Flip-Flops: RS Flip-flop, D Flip Flop, Edge-triggered D Flip-flop, Edge-triggered JK Flip-flop, JK Master-slave Flip-flop, Registers, Shift Registers, Counters, Ripple Counters, Synchronous Counters. Introduction to digital families: TTL, CMOS, etc.

Unit V:
High Interface serial interfaces (PCIs, USB4, DDR5), classical to quantum interface circuits, Secure Hardware design. Logic Design for Neural Networks Inference
Case Studies of digital system: Traffic light controller, Digital Lock System, Digital Voting Machine, Automatic Water Level Controller etc.

Reference Books:

- Digital Design, Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications, Anil K. Maini, Wiley.
- Modern Digital Electronics, V Edition, R.P. Jain, Kishore Sarawadekar, McGraw Hill.

Course Outcomes:

After completion of the course students will be able to:

CO1: Recall different number system and solve the basic arithmetic operations.
CO2: Apply Boolean algebra and Karnaugh maps to analyze, simplify, and minimize complex Boolean expressions.
CO3: Develop the understanding of combinational circuits.
CO4: Analyze the basic concept of sequential circuits.
CO5: Analyze the functionality of implemented digital systems.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	2	1	1	1	1	1	2	3	2	3
CO2	2	2	2	1	2	1	1	1	1	1	2	3	2	3
CO3	3	2	2	1	2	1	1	1	1	1	2	3	2	3
CO4	2	2	2	1	2	1	1	1	1	1	2	3	2	3
CO5	2	2	2	1	2	1	1	1	1	1	2	3	2	3

1 - Slightly; 2 - Moderately; 3 – Substantially

Digital Electronics
15241103(OLD)

Course Objectives:

- To perform the analysis and design of various digital electronic circuits.
- To learn various number systems, boolean algebra, and logic gates.
- To understand the concept of counters, latches, flip-flops and memories.

Unit I:

Introduction to Digital Electronics, Needs and Significance, Different Number Systems: Binary Numbers, Octal and Hexadecimal Numbers, Conversions, Complement's, Signed Binary Numbers, Binary Arithmetic, Binary Codes: BCD, ASCII Codes.

Unit II:

Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations, Digital Logic Gates, De Morgan's Theorem, Karnaugh Maps and simplification/minimization, Prime Implicants and its types.

Unit III:

Combinational Circuits, Half Adder, Half Subtractor, Full Adder and Full Subtractor, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers, Demultiplexer.

Unit IV:

Sequential Circuits, Level Clocking, Latches, Flip-Flops: RS Latches, RS Flip-flop, D Latches, Edge-triggered D Flip-flop, Edge-triggered JK Flip-flop, JK Master-slave Flip-flop, T Flip-flop; Registers, Shift Registers, Counters, Ripple Counters, Synchronous Counters.

Unit V:

Introduction to Memory, Memory Decoding, Error Detection and Correction methods, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices, RTL and DTL Circuits, TTL, ECL, MOS, CMOS, Application Specific Integrated Circuits.

Reference Books:

- Digital Design, Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications, Anil K. Maini, Wiley.
- Modern Digital Electronics, V Edition, R.P. Jain, Kishore Sarawadekar, McGraw Hill.

Course Outcomes:

After completion of the course students will be able to:

CO1: Explain the computer architecture for defining basic component and functional unit.
CO2: Recall different number system and solve the basic arithmetic operations and Boolean functions.
CO3: Develop the understanding of combinational circuits.
CO4: Analyze the basic concept of sequential circuits.
CO5: Compare various memories.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		1		1		1						2	
CO2	3	2	2				1							1
CO3	2	3	2				1			1			2	
CO4	3	3	2				1			1			2	
CO5		3	1			1			1		2		1	

1 - Slightly; 2 - Moderately; 3 – Substantially

Cyber World and Security Concern
15251104

COURSE OBJECTIVES

- To understand the cyber security threat landscape.
- To analyse and evaluate existing legal framework and laws on cyber security.
- To analyse and evaluate the digital payment system security and remedial measures against digital payment frauds.

Unit-I

Introduction to Cyber security: 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: Classification of cybercrimes, Common cybercrimes- cybercrime targeting computers and mobiles, cybercrime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi , Reporting of cybercrimes, Remedial and mitigation measures.

Unit-III

Social Media Overview and Security: 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, Fake News, Deepfakes and Information Warfare, Case studies.

Unit-IV

E-Commerce and Digital Payments: Definition of E- Commerce, 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), Digital payments related common frauds and preventive measures.

Unit-V

Cyber Security and Case Study: Antivirus and Anti-malware software, Cryptography and Data Protection, Virtual Private Network (VPN) and its Applications, Case Studies on Cybersecurity Incidents: Ransomware attack on a hospital, Data breach from a social media platform, Cloud misconfiguration and data leak, Phishing and spear-phishing attack on a financial institution

Reference Books:

- Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
- Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
- Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
- Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
- Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers
- Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
- Fundamentals of Network Security by E. Maiwald, McGraw Hill.

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Understand the** concept of Cyber security, issues and challenges associated with it.

CO2. **Understand** the cyber crimes, their nature, legal remedies and as to how report the crimes through available platforms and procedures.

CO3. **Identify** various privacy and security concerns on online Social media.

CO4. **Analyze** the basic concepts related to E-Commerce and digital payments.

CO5. **Analyze** security aspects through case studies.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	1	3	3	1	2	1	1	2	3	2	3
CO2	2	1	2	1	3	3	1	2	1	1	2	3	2	3
CO3	3	1	3	1	3	3	1	2	1	1	2	3	2	3
CO4	2	1	3	1	3	3	1	2	1	1	2	3	2	3
CO5	3	1	2	1	3	3	1	2	1	1	2	3	2	3

1 - Slightly; 2 - Moderately; 3 – Substantially

Department of Computer Science and Engineering

Cyber World and Security Concern
15241104(OLD)

COURSE OBJECTIVES

- To understand the cyber security threat landscape.
- To analyse and evaluate existing legal framework and laws on cyber security.
- To analyse and evaluate the digital payment system security and remedial measures against digital payment frauds.

Unit-I

Introduction to Cyber security: 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

Cyber crime and Cyber law: Classification of cyber crimes, Common cyber crimes- cyber crime targeting computers and mobiles, cyber crime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Cybercriminals modus-operandi , Reporting of cyber crimes, Remedial and mitigation measures, Legal perspective of cyber crime, IT Act 2000 and its amendments, Cyber crime and offences, Organizations dealing with Cyber crime and Cyber security in India, Case studies.

Unit-III

Social Media Overview and Security: 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: Definition of E- Commerce, 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 payments

related common frauds and preventive measures. RBI guidelines on digital payments and customer protection in unauthorised banking transactions. Relevant provisions of Payament Settlement Act,2007

Unit-V

Digital Devices Security, Tools and Technologies for Cyber Security: 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.

Reference Books:

- Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
- Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
- Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
- Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
- Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers
- Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
- Fundamentals of Network Security by E. Maiwald, McGraw Hill.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(Deemed to be University)

(Declared Under Distinct Category by Ministry of Education, Government of India)

NAAC Accredited with A++ Grade

Department of Computer Science and Engineering

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1. **Understand** the concept of Cyber security and issues and challenges associated with it.

CO2. **Understand** the cyber crimes, their nature, legal remedies and as to how report the crimes through available platforms and procedures.

CO3. **Identify** various privacy and security concerns on online Social media.

CO4. **Analyze** the basic concepts related to E-Commerce and digital payments..

CO5. **Evaluate** security aspects related to Computer and Mobiles. S

Course Articulation Matrix

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2			3				1	2			2
CO2	2	3		3					1			2	3	
CO3		3			2	2			1			1	2	
CO4	3		2								1	1	2	
CO5		3		2			1		1			2		1

1 - Slightly; 2 - Moderately; 3 – Substantially

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(Deemed to be University)

(Declared Under Distinct Category by Ministry of Education, Government of India)

NAAC Accredited with A++ Grade

Department of Computer Science and Engineering

Computer Programming Lab
15251106

List of Experiment

1. Write a program to display the use of all data types, constants, and keywords in C.
2. Develop a calculator using operators and expressions to perform +, -, *, /, and % operations based on user input.
3. Convert a flowchart or algorithm (e.g., finding the area of a circle or simple interest) into a working C program using proper input/output functions.
4. Write a program to find the largest of three numbers using if-else and nested if statements.
5. Write a menu-driven program using switch statement (e.g., calculator or student grade system).
6. Write a program to display a number pattern using nested for loops and demonstrate use of break and continue.
7. Write a program to input and sort an array using any sorting algorithm (e.g., bubble sort).
8. Write a program that performs string manipulation without using built-in string functions (e.g., strlen, strcpy).
9. Demonstrate use of pointers: Write a program using pointer to array, pointer to pointer, and array of pointers.
10. Write a program to calculate factorial using recursion and another version using iteration.
11. Define a structure for student details and write a program to input and display data for multiple students.
12. Demonstrate dynamic memory allocation using malloc() and free() for creating an array during runtime.
13. Write a program to read and write student records to a file, then display all records from the file.
14. Create a program that draw a Circle and a Rectangle in a window using SFML.
15. Define an enum for weekdays and write a program to display the name of the day based on user input.
16. Implement a game loop that moves a ball and bounces it off window edges.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(Deemed to be University)

(Declared Under Distinct Category by Ministry of Education, Government of India)

NAAC Accredited with A++ Grade

Department of Computer Science and Engineering

COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1 Understand the concepts of memory addressing and pointer manipulation.

CO2 Demonstrate how conditional statements influence the control flow of a program.

CO3 Understand how data is represented and stored in external memory.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	2	2			1		2	1	1	2	2
CO2	3	2	2	2	2			1		2	1	1	2	2
CO3	3	3	2	2	2			1		2	1	1	2	2

1 - Slightly; 2 - Moderately; 3 – Substantially

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(Deemed to be University)

(Declared Under Distinct Category by Ministry of Education, Government of India)

NAAC Accredited with A++ Grade

Department of Computer Science and Engineering

Digital Electronics Lab

15251107

List of Experiment

1 To verify the truth tables for Logic Gates - AND, OR, NOT, EX-OR, EX-NOR, NAND, and NOR.
2 To verify De-Morgan's Theorem.
3 To realize basic logic gates using universal gates.
4 To verify the truth table of half adder and full adder.
5 To verify the truth table of half subtractor and full subtractor.
6 To design and verify the truth table of a three bit odd parity generator and checker.
7 To implement a binary to gray code converter.
8 Implementation of 3x8 Decoder
9 Implementation of 4x1 multiplexer, using logic gates.
10 To design S-R flip flop and D flip flop.
11 To design J-K flip flop.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(Deemed to be University)
(Declared Under Distinct Category by Ministry of Education, Government of India)
NAAC Accredited with A++ Grade

Department of Computer Science and Engineering

LAB COURSE OUTCOMES

After completion of this course, the students would be able to:

CO1: **Implement** the functionality of universal logic gates, adders, subtractors, multiplexers, and code converters using combinational circuit techniques.
CO2: **Analyze** the behavior of sequential circuits such as flip-flops, counters, and shift registers to understand timing, state transitions, and data flow.
CO3: **Construct** combinational and sequential logic circuits and analyze their outputs to validate theoretical concepts and circuit behavior under different inputs.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	2	1	1	1	1	1	2	3	2	3
CO2	2	2	2	1	2	1	1	1	1	1	2	3	2	3
CO3	3	2	2	1	2	1	1	1	1	1	2	3	2	3

1 - Slightly; 2 - Moderately; 3 – Substantially

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(Deemed to be University)

(Declared Under Distinct Category by Ministry of Education, Government of India)

NAAC Accredited with A++ Grade

Department of Computer Science and Engineering

Micro Project-I
15251109

List of Micro-Projects:

- Student marks grading system using C
- ATM simulator using switch-case
- Voting system using loops and arrays
- Library management system
- C program to calculate electricity bill
- Calendar generator using loops
- Tic-Tac-Toe game using 2D array
- C program for employee record management
- Calculator using functions
- C program to simulate banking operations
- Binary to decimal/octal converter
- Logic gate simulator using software
- Half and Full Adder Circuit using breadboard
- 4-bit binary counter using flip-flops
- LED blink pattern using logic gates
- Digital dice using counter IC
- Multiplexer simulation using software tools
- BCD to 7-segment display simulation
- Truth table verifier using Arduino
- RS and JK Flip-Flop simulation
- Password strength checker (C or Python)
- Digital transaction fraud scenarios (poster/presentation/project)
- Phishing awareness simulation
- Quiz game on cyber safety rules (C or web-based)
- Awareness campaign on digital payment frauds
- Mock UPI transaction simulator (no real payment)
- File encryption/decryption tool in C

Department of Computer Science and Engineering

- Safe browser extension concept presentation
- Cyberbullying awareness campaign project
- Temperature monitoring using DHT11 and Arduino
- Motion detection system using PIR sensor
- LED control via mobile app using Bluetooth
- Soil moisture sensor for smart irrigation
- Smart dustbin with ultrasonic sensor
- Light-controlled room lighting system (LDR)
- RFID-based attendance system
- Water level indicator using sensor
- Smart fan using temperature sensor
- Fire alert system using flame sensor
- Student data analyzer using basic C logic
- Mini expert system using if-else rules
- Word frequency counter using C
- CSV file reader and analyzer in C
- Project presentation on cloud types and models
- Comparison of traditional vs big data systems
- AI use-cases.
- Disease classification
- Object detection
- Digit recognition
- Face sentiment recognition
- Gesture-based automatic control system

Course Outcomes:

After completion of this course, the students would be able to:

CO1: Apply basic programming, logic building, and circuit design skills to develop working mini-projects.

CO2: Demonstrate understanding of foundational technologies such as IoT, Cybersecurity, and Digital Electronics.

CO3: Build teamwork and project management capabilities through collaborative development and presentation of micro-projects.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2	2	1	1	1	1	1	2	2	2	2
CO2	2	2	2	1	2	2	1	2	1	1	2	3	2	3
CO3	1	1	2	1	1	1	1	1	1	1	3	3	2	3

1 - Slightly; 2 - Moderately; 3 – Substantially