

Annexure-I

Scheme of Examination

B.Tech. VIII Semester (Computer Science and Engineering) *for batch admitted in Academic Session 2018-19*

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot		MOOCs			L	T	P	
				End Sem.	Mid Sem. Exam	Quiz/ Assignment	End Sem.	Lab Work & Sessional	Assignment	Exam					
1.	DE	DE	Departmental Elective* (DE-5)	-	-	-	-	-	25	75	100	3	-	-	3
2.	DE	DE	Departmental Elective* (DE-6)	-	-	-	-	-	25	75	100	3	-	-	3
3.	OC	OC	Open Category* (OC-4)	-	-	-	-	-	25	75	100	2	-	-	2
4.	150801	DLC	Internship/Project (DLC-9)	-	-	-	250	150	-	-	400	-	-	6	3
5.	150802	-	Professional Development [#]	-	-	-	-	50	-	-	50	-	-	2	1
Total				-	-	-	250	200	75	225	750	8	-	8	12
Additional Courses for obtaining Honours or minor Specialization by desirous students				Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization											

*All of these courses will run through SWAYAM/NPTEL/ MOOC

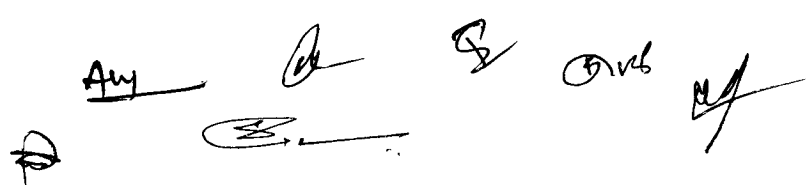
[#] Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical and other events during the complete tenure of the UG programme (participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOCs and technical events)

DE -5*		
S. No.	Subject Code	Subject Name
1.	150851	Social Network
2.	150854	Ethical Hacking
3.	150855	Hardware Security

DE-6*		
S. No.	Subject Code	Subject Name
1.	150856	Blockchain and its applications
2.	150857	Online Privacy
3.	150853	Reinforcement Learning

OC-4*		
S. No.	Subject Code	Subject Name
1.	900627	Ethical Hacking
2.	900619	Introduction to Internet of Things
3.	900628	Online Privacy

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform



Annexure-I

List of courses to be opted for Honours or Minor specialization in VIII Semester

Honours* (to be opted by students of Parent Department)	Minor Specialization* (to be opted by students of Other Department)
Advance Computer Architecture	Cloud Computing and Distributed Systems
Information Security - 5 - Secure Systems Engineering	Introduction to Machine Learning
Foundations of Cryptography	Data Science for Engineers

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform



Syllabus to Develop MOOC (Internet of Things: An Overview)

Department:	Computer Science & Engineering	
Name of Faculty:	Dr. Anjula Mehto	
Subject:	Internet of Things: An Overview	Type: MOOC (Open Elective)
Course Objectives:-		
<ol style="list-style-type: none"> 1. To study fundamental concepts of Internet of Things (IoT) 2. To understand roles of sensors in IoT 3. To Learn different protocols used for IoT design 4. Understand the role of IoT in various domains of Industry 		

Unit-1

Fundamentals of IoT: Introduction, Definitions & Characteristics of IoT, IoT Functional Blocks, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M, Networking basics, Communication Protocols,

Unit-2

Sensors Networks : Sensing, Actuation, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, RaspberriPi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node, Connecting nodes, Networking Nodes, WSN and IoT.

Unit-3

IoT Reference Architecture- Getting Familiar with IoT Architecture, Various architectural views of IoT such as Functional, Information, Operational and Deployment. Constraints affecting design in IoT - world- Introduction, Technical design Constraints, Reference Model of IoT

Unit-4

Wireless Technologies for IoT: WPAN Technologies for IoT: IEEE 802.15.4, Zigbee, HART, NFC, Z-Wave, BLE, Bacnet, Modbus. IP Based Protocols for IoT IPv6, 6LowPAN, RPL, REST, AMQP, CoAP, MQTT. Edge connectivity and protocols

Unit-5

Applications of IoT: Home Automation, Smart Cities, Energy, Retail Management, Logistics, Agriculture, Health and Lifestyle, Industrial IoT, Legal challenges, IoT design Ethics, IoT in Environmental Protection.

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Scheme of Examination
B.Tech. VI Semester (Computer Science and Engineering)

For batches admitted in Academic Session 2019-20

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	
				Theory Slot			Practical Slot		MOOCs		L	T	P		
				End Sem.	Mid Sem Exam.	Quiz/ Assignment	End Sem.	Lab work & Sessional	Assignment						Exam
1.	150601	DC	Compiler Design (DC-12)	70	20	10	30	20			150	2	1	2	4
2.	150602	DC	Computer Networks (DC-13)	70	20	10	-	-			100	4	-	-	4
3.	DE	DE	DE-1	70	20	10	-	-			100	4	-	-	4
4.	DE	DE	DE-2*	-	-	-	-	-	25	75	100	4	-	-	4
5.	OC	OC	OC-1	70	20	10	-	-			100	2	1	-	3
6.	100007	MC-4	Disaster Management	70	20	10	-	-			100	3	-	-	3
7.	150603	DLC-5	Minor Project-II	-	-	-	50	50			100	-	-	4	2
Total				350	100	50	80	70	25	75	750	19	2	6	24
Summer Internship-III (On Job Training) for Four weeks duration: Evaluation in VII Semester															
Additional Course for Honours or minor Specialization				Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization											

* At least one of these courses must be run through SWAYAM/NPTEL/MOOC

DE -1 (Through Traditional Mode)		
S. No.	Subject Code	Subject Name
1.	150611	Network & Web Security
2.	150612	Image Processing
3.	150613	Mobile Computing

DE -2*		
S. No.	Subject Code	Subject Name
1.	150656	Introduction To Internet of Things
2.	150657	Object Oriented System Development Using UML, Java And Patterns
3.	150654	An Introduction to Artificial Intelligence

OC-1		
S. No.	Subject Code	Subject Name
1.	900106	Data Structures
2.	900107	Python Programming

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform



List of courses to be opted for Honours or Minor specialization in VI Semester

Honours* (to be opted by students of Parent Department)	Minor Specialization* (to be opted by students of Other Department)
GPU Architectures and Programming	Programming In Java (Programming)
Introduction to parallel programming with OpenMP and MPI	Data Base Management System (Programming)
Data Science for Engineers	Ethical Hacking (Systems)
	Computer Networks and Internet Protocol (Systems)

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

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Annexure-III

*Syllabi of
Departmental Core (DC) Courses
B.Tech VI Semester
(Computer Science and Engineering)
Batch admitted in 2019-20*

Department of Computer Science and Engineering

COMPILER DESIGN
150601 (DC-12)

COURSE OBJECTIVES

- To learn finite state machines and context free grammar.
 - To learn, various phases of compiler
 - To understand process of compiler implementation.
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Unit-I

Overview of Translation Process: Introduction to Compiler, Major Data Structures in Compiler, Other Issues in Compiler Structure, BOOT Strapping and Porting, Compiler Structure: Analysis-Synthesis Model of Compilation, Various Phases of a Compiler, Tool Based Approach to Compiler Construction.

Unit-II

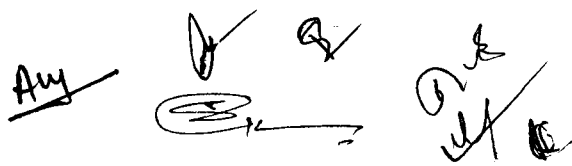
Lexical Analysis: Input Buffering, Symbol Table, Token, Recognition of Tokens, Lexeme and Patterns, Difficulties in Lexical Analysis, Error Reporting and Implementation. Regular Grammar & Language Definition, Transition Diagrams, Design of a Typical Scanner using LEX.

Unit-III

Syntax Analysis: Context Free Grammars (CFGs), Ambiguity, Basic Parsing Techniques: Top Down Parsing, Recursive Descent Parsing, Transformation on the Grammars, Predictive Parsing LL(1) Grammar, Bottom-UP Parsing, Operator Precedence Parsing, LR Parsers (SLR, CLR, LALR), Design of a Typical Parser Using YACC.

Unit-IV

Semantic Analysis: Compilation of Expression, Control, Structures, Conditional Statements, Various Intermediate Code Forms, Syntax Directed Translation, Memory Allocation and Symbol Table Organizations, Static and Dynamic Array Allocation, String Allocation, Structure Allocation etc.. Error Detection Indication and Recovery, Routines or Printing Various Lexical, Syntax and Semantic Errors.

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Unit-V

Code Generation and Code Optimization: Issues, Basic Blocks and Flow Graphs, Register Allocation, Code Generation, DAG Representation of Programs, Code Generation from DAGS, Peep-hole Optimization, Code Generator Generators, Specification of Machine. Code Optimization: Source of Optimizations, Optimization of Basic Blocks, Loops, Global Data Flow Analysis, Solution to Iterative Data Flow Equations, Code Improving Transformations, Dealing with Aliases, Data Flow Analysis of Structured Flow Graphs.

RECOMMENDED BOOKS

- Compilers: Principles, Techniques and Tools, V. Aho, R. Sethi and J. D. Ullman, Pearson Education.
- Compiler Construction: Principles and Practice, K.C. Louden, Cengage Learning.

COURSE OUTCOMES

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

CO1. define the concepts of finite automata and context free grammar.

CO2. build the concept of working of compiler.

CO3. examine various parsing techniques and their comparison.

CO4. compare various code generation and code optimization techniques.

CO5. analyze different tools and techniques for designing a compiler.

CO6. design various phases of compiler.

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Department of Computer Science and Engineering

COMPUTER NETWORKS 150602
(DC-13)

COURSE OBJECTIVES

- Familiarize the student with the basic taxonomy and terminology of the computer networking.
- Provide detail knowledge about various layers, protocols and devices that facilitate networking.
- Enable students to deal with various networking problems such as flow control, error control and congestion control.

Unit-I

Introduction: Computer Network, Types- LAN, MAN & WAN, Data Transmission Modes- Serial & Parallel, Simplex, Half Duplex & Full Duplex, Synchronous & Asynchronous Transmission, Transmission Medium- Guided & Unguided, Cables- Twisted Pair, Coaxial Cable & Optical Fiber, Networking Devices- Repeaters, Hub, Switch, Bridge, Router, Gateway and Modem, Performance Criteria- Bandwidth, Throughput, Propagation Time & Transmission Time, Network Standardization- OSI Reference Model & TCP/IP Reference Mode.

Unit-II

Physical Layer: Network topologies- Bus, Ring, Star & Mesh, Line Coding- Unipolar, Polar and Bipolar, Switching- Circuit Switching, Message Switching & Packet Switching, Multiplexing: FDM – Frequency Division Multiplexing, WDM – Wavelength Division Multiplexing & TDM – Time Division Multiplexing.

Unit-III

Data Link Layer: Introduction, Design Issues, Services, Framing, Error Control, Flow Control, ARQ Strategies, Error Detection and Correction, Parity Bits, Cyclic Redundant Code (CRC), Hamming Codes, MAC Sub Layer- Channel Allocation Problem, Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, IEEE 802.3, IEEE 802.4 and IEEE 802.5.

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Unit-IV

Network Layer & Transport Layer: Introduction, Design Issues, Services, Routing- Distance Vector Routing, Hierarchical Routing & Link State Routing, Shortest Path Algorithm- Dijkstra's Algorithm & Floyd-Warshall's Algorithm, Flooding, Congestion Control- Open Loop & Closed Loop Congestion Control, Leaky Bucket & Token Bucket Algorithm. Connection Oriented & Connectionless Service, IP Addressing.

Unit-V

Presentation, Session & Application Layer: Introduction, Design Issues, Presentation Layer- Translation, Encryption- Substitutions and Transposition Ciphers, Compression- Lossy and Lossless. Session Layer – Dialog Control, Synchronization. Application Layer- Remote Login, File Transfer & Electronic Mail.

RECOMMENDED BOOKS

- Data Communication and Networking, Behrouz A. Forouzan, McGraw Hill.
- Computer Networks, Andrew S. Tanenbaum, Pearson Education India.
- Computer Networks and Internets, Douglas E. Comer, Pearson India.

COURSE OUTCOMES

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

- CO1. explain the fundamental concepts of computer network.
- CO2. illustrate the basic taxonomy & terminologies of computer network protocols.
- CO3. develop a concept for understanding advance computer network.
- CO4. build the skill of IP addressing and routing mechanism.
- CO5. predict the performance of computer network in congestion and internet.
- CO6. construct the network environment for implementation of computer networking concept.

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Syllabi of
Departmental Elective (DE-1) Courses
B.Tech VI Semester
(Computer Science and Engineering)
Batch admitted in 2019-20

Annexure-IV

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Department of Computer Science and Engineering

NETWORK & WEB SECURITY
150611 (DE-1)

COURSE OBJECTIVES

- To provide conceptual understanding of network security principles, issues, challenges and mechanisms.
 - To understand how to apply encryption techniques to secure data in transit across data networks.
 - To explore the requirements of real-time communication security and issues related to the security of web services.
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Unit-I

Security: Principles and Attacks, Basic Number Theory: Prime Number, Congruence's, Modular Exponentiation, Fundamentals of Cryptography, Steganography, Cryptanalysis, Code Breaking, Block Ciphers and Steam Ciphers, Substitution Ciphers, Transposition Ciphers, Caesar Cipher, Play-Fair Cipher, Hill Cipher, Cipher Modes of Operation.

Unit-II

Cryptography: Symmetric Key Cryptography, Public Key Cryptography, Principles of Public Key Cryptosystem, Classical Cryptographic Algorithms: DES, RC4, Blowfish, RSA, Distribution of Public Keys and Key Management, Diffie-Hellman Key Exchange.

Unit-III

Hash Functions: Hash Functions, One Way Hash Function, SHA (Secure Hash Algorithm). **Authentication:** Requirements, Functions, Kerberos, Message Authentication Codes, Message Digest: MD5, SSH (Secure Shell), Digital Signatures, Digital Certificates.

Unit-IV

IP & Web Security Overview: SSL (Secure Socket Layer), TLS (Transport Layer Security), SET (Secure Electronic Transaction). **IDS (Intrusion detection system):** Statistical Anomaly Detection and Rule-Based Intrusion Detection, Penetration Testing, Risk Management. **Firewalls:** Types, Functionality and Polices.

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Unit -V

Phishing: Attacks and its Types, Buffer Overflow Attack, Cross Site Scripting, SQL Injection Attacks, Session Hijacking, Denial of Service Attacks: Smurf Attack, SYN Flooding, Distributed Denial of Service. Hacker: Hacking and Types of Hackers, Foot Printing, Scanning: Types: Port, Network, Vulnerability), Sniffing in Shared And Switched Networks, Sniffing Detection & Prevention, Spoofing.

RECOMMENDED BOOKS

- Cryptography and Network Security, William Stallings, Pearson Education.
- Cryptography and Network Security, Atul Kahate, McGraw Hill Education.
- Incident Response and Computer Forensics, Kevin Mandia, Chris Prorise, Tata McGraw Hill.

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. explain cryptographic algorithms, hash algorithms and authentication mechanisms.
- CO2. illustrate fundamentals of number theory, attacks and security principles.
- CO3. apply number theory and various algorithms to achieve principles of security.
- CO4. analyze the cause for various existing network attacks and describe the working of available security controls.
- CO5. examine the vulnerabilities in IT infrastructure.
- CO6. predict the attacks and controls associated with IP, transport-level, web and e-mail security.

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Department of Computer Science and Engineering

IMAGE PROCESSING
150612 (DE-1)

COURSE OBJECTIVES

- To understand the fundamentals of image acquisition, image processing in various domains.
 - To understand image transformation, enhancement and restoration techniques used in image processing.
 - To know image registration and segmentation used in image processing.
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Unit- I

Introduction and Fundamentals: Introduction to Image Processing Systems, Digital Image Fundamentals: Components of Digital Image Processing System, Image Model, Imaging Geometry, Sampling and Quantization of Images, Classification of Digital Images, Zooming and Shrinking, Relationship Between Pixels.

Unit- II

Image Enhancement in Spatial Domain: Introduction, Basic Gray Level Function, Piecewise Linear Transformation, Contrast Stretching, Histogram Specification, Histogram Equalization, Local Enhancement using Arithmetic and Logical Operation- Image Subtraction, Image Averaging Image Smoothing: Smoothing Spatial Filters, Smoothing Linear Filters, Image Sharpening.

Unit- III

Image Enhancement in Frequency Domain: Introduction to Fourier Transform, Filters: Low Pass and High Pass, Gaussian Filters, Homomorphic Filtering.

Image Restoration- Model of Image Degradation/Restoration Process, Noise Models, Noise Reduction in Spatial Domain and Frequency Domain, Inverse Filtering, Mean Filters, Least Mean Square(Wiener) Filtering, Fir Wiener Filter.

Unit -IV

Morphological Image Processing: Logic Operation Involving Binary Images, Dilation And Erosion, Opening and Closing, Morphological Algorithms: Boundary Extraction, Region Filling, Extraction Of Connected Components, Convex Hull, Thinning, and Thickening.

D.P. Singh
B. Singh

Unit -V

Image Registration: Introduction, Geometric Transformation, Plane to Plane Transformation, Mapping.

Image Segmentation: Introduction, Region Extraction, Pixel Based Approach, Multilevel Thresholding, Local Thresholding, Region Based Approach, Region Growing, Splitting and Merging, Edge and Line Detection, Corner Detection, Detection of Discontinuities, Edge Linking and Boundary Detection.

RECOMMENDED BOOKS

- Digital Image Processing, Rafael C Gonzalez, Richard E Woods, Pearson Education.
- Fundamentals of Digital Image Processing, K. Jain, Pearson Education.
- Digital Image Processing, S. Esakkirajan, S. Jayaraman, T. Veerakumar, Tata McGraw-Hill Education.

COURSE OUTCOMES

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

- CO1. define different modalities and current techniques in image processing.
 - CO2. classify spatial and frequency domain techniques used in image processing.
 - CO3. apply image processing techniques to enhance visual images.
 - CO4. analyse the constraints in image processing when dealing with real problems.
 - CO5. evaluate various enhancement, restoration and retrieval techniques of image processing.
 - CO6. design a system using the mathematical models and principles of digital image processing for real world problems.
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Department of Computer Science and Engineering

MOBILE COMPUTING
150613 (DE-1)

COURSE OBJECTIVES

- To introduce the basic concepts and principles in mobile computing.
 - To provide a computer systems perspective on the converging areas of wireless networking, mobile devices, and network protocols.
 - To introduce wireless communication and networking principles, that support connectivity to cellular networks, wireless internet and sensor devices.
-

Unit-I

Review of Personal Communication Services (PCS): Basic Concepts of Cellular Systems, Global System for Mobile Communication (GSM), Protocols, Handover, Data Services, and Multiple Division Techniques.

Unit-II

General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes. Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 Standard. Mobile IP.

Unit-III

Wireless Application Protocol (WAP): Mobile Internet Standard. WAP Gateway and Protocols, Wireless Markup Languages (WML).

Unit-IV

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) Vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of Services in 3G.

Unit-V

Wireless Local Loop (WLL): Introduction to WLL Architecture, WLL Technologies. Global Mobile Satellite Systems: Case Studies of IRIDIUM and GLOBALSTAR Systems. Bluetooth Technology, Wi-Fi and Wi-Max.

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RECOMMENDED BOOKS

- Mobile communications, J. Schiller, Pearson Education.
 - Wireless and Mobile Networks Architecture, by Yi —Bing Lin, John Wiley & Sons.
 - Mobile & Personnel Communication Systems and Services, Raj Pandya, Prentice Hall India.
 - Wireless Communication- Principles and Practices, Theodore S. Rappaport, Pearson Education.
 - The Wireless Application Protocol, Singhal & Bridgman, Pearson Education.
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COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. explain the basic concepts of mobile telecommunications system.
 - CO2. demonstrate the infrastructure to develop mobile communications system.
 - CO3. classify the different generations and technology for mobile communications.
 - CO4. examine the working of different protocols of wireless mobile communication technology.
 - CO5. determine the importance of each technology suitable for different situation of mobile and wireless communications.
 - CO6. develop protocols for adhoc and infrastructure based wireless networks.
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Syllabi of
Open Category Courses
B.Tech VI Semester
(Computer Science and Engineering)
Batch admitted in 2019-20
Annexure-V

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Department of Computer Science and Engineering

DATA STRUCTURES
900106 (OC-1)

COURSE OBJECTIVES

- To be familiar with the use of data structures as the foundational base for computer solutions to problems.
 - To understand various techniques of searching and sorting.
 - To understand basic concepts about stacks, queues, lists, trees and graphs.
-

Unit-I

Introduction to Data Structures: Algorithms & their Characteristics, Asymptotic Notations. Arrays and its Representations, Index to Address Translation. **Linked List:** Introduction, Implementation of Linked List, Operations, Circular Linked List, Doubly Linked List, Polynomial Manipulation using Linked List.

Unit-II

Stacks: Concepts and Implementation of Stacks, Operations on Stack, Conversion of Infix to Postfix Notation, Evaluation of Postfix Expression, Recursion.
Queues: Concepts and Implementation, Operations on Queues, Dequeue, Priority Queues, Circular Queues and Application.

Unit-III

Trees: Types, Terminology, Binary Tree -Representations, Traversal, Conversion of General Tree to Binary Tree, Binary Search Tree, Threaded Binary Tree and Height Balanced Tree.

Unit-IV

Graphs: Background, Graph Theory Terminologies, Representation of Graphs- Sequential & Linked Representation, Path Matrix, Graph Traversals- BFS, DFS, Spanning Trees, Applications of Graph.

Unit-V

Searching & Sorting: Linear Search, Binary Search, Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Radix Sort and Heap Sort, Comparison between Sorting Techniques, Hashing and Collision Resolution Techniques.

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RECOMMENDED BOOKS

- Data Structures, Algorithms and Applications in C++, Sartaj Sahni, 2nd Edition.
- An Introduction to Data Structures with Applications, Jean-Paul Tremblay, Mcgraw hill.
- Data Structures & Algorithms, Aho, Hopcroft & Ullman, original edition, Pearson Publication.

COURSE OUTCOMES

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

- CO1. outline the basics of algorithms and their performance criteria.
 - CO2. explain the working of linear/non-linear data structures.
 - CO3. identify the appropriate data structure to solve specific problems.
 - CO4. analyze the performance of various data structures & their applications.
 - CO5. evaluate the time/space complexities of various data structures & their applications.
 - CO6. design the optimal algorithmic solutions for various problems.
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Dr. Anil K. Singh
Principal

Department of Computer Science and Engineering

PYTHON PROGRAMMING
900107 (OC-1)

COURSE OBJECTIVES

- To understand the structure and components of a python program.
 - To learn the basic construct of python programming for implementing interdisciplinary research-based problems.
 - To plot data using appropriate python visualization libraries for analysis.
-

Unit I

Introduction to Python: Setting Up Programming Environment, Running Python Programs from a Terminal, Variables and Simple Data Types: Variables, Strings, Numbers and Maths, Comments, Conditional Statements, Introducing Loops, Working of Input Function.

Unit II

Tuples and Lists: Tuples, Lists, List Operations, Using If Statements with Lists, Organizing a List, Working with Lists: Looping through Entire List, Making Numeric Lists, Working with Part of List. Dictionaries and Sets: Simple Dictionary, Looping Through a Dictionary, Nesting, Example with a Dictionary, Fibonacci and Dictionaries, Global Variables, Defining a Set, Set Operations.

Unit III

Functions: Defining a Function, Passing Arguments, Return Values, Passing a List, Passing an Arbitrary Number of Arguments, Storing Functions in Module, In- Built Functions, Lambda Functions. **Classes and Inheritance:** Object Oriented Programming, Creating and using a Class, Working with Class Instances, Methods, Inheritance, Importing Classes, Python Standard Library.

Unit IV

Files and Exceptions: Reading from a File, Writing to a File, File Operations, Assertions, Exceptions, Exception example. **Debugging:** Programming Challenges, Classes of Tests, Bugs, and Debugging, Debugging examples.

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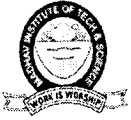


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***List of
Experiments
B.Tech VI Semester
(Computer Science and Engineering)
Batch admitted in 2019-20***

Annexure-VI

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005
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Department of Computer Science and Engineering

Compiler Design
150601 (DC)
List of Experiments

- 1) Write a program to convert NFA to DFA
- 2) Write a program to minimize DFA.
- 3) Develop a lexical analyzer to recognize a few patterns.
- 4) Write a program to parse using Brute force technique of Top down parsing.
- 5) Develop LL (1) parser (Construct parse table also).
- 6) Develop an operator precedence parser (Construct parse table also).
- 7) Develop a recursive descent parser.
- 8) Write a program for generating for various intermediate code forms.
 - i) Three address code
 - ii) Polish notation
- 9) Write a program to simulate Heap storage allocation strategy.
- 10) Generate Lexical analyzer using LEX.
- 11) Generate YACC specification for a few syntactic categories.
- 12) Given any intermediate code form implement code optimization techniques.
- 13) Study of an Object-Oriented Compiler.

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For batches admitted in Academic Session 2020-21 Onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem.	Continuous Evaluation								
				End Term Evaluation	Proficiency in subject/course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill based mini project							
1.	150411	DC	Computer Networks	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
2.	150412	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
3.	150413	DC	Software Engineering	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	MCQ
4.	150414	DC	Theory of Computation	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
5.	150415	DLC	Programming Lab Python Programming	-	-	-	-	60	20	20	100	-	-	4	2	Offline	SO
6.	150416	DC	Discrete Structures	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
7.	2000XXX	CLC	Novel engaging courses					50	-	-	50	-	-	2	1	Interactive	SO
Total				250	50	100	100	230	60	60	850	13	2	10	20		
8.	1000001	MAC	Indian Constitution and Traditional Knowledge(Mandatory Audit Course) \$\$	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ
Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester																	

MCQ: Multiple Choice Question

AO: Assignment + Oral

OB: Open Book

PP: Pen Paper

SO: Submission & Oral

CLC: College level course

\$Proficiency in course/subject – includes the weightage towards ability/ skill/ competence /knowledge level /expertise attained /attendance ,one minute paper writing etc. in that particular course/subject,\$\$ Course will run for Group A/B in III/IV semester respectively.

Mode of Teaching					Mode of Examination						Total Credits
Theory		Blended		Lab	Theory			Lab	SIP/SLP/NEC		
Offline	Online	Offline	Online	Offline	Interactive	PP	A+O	MCQ	SO	SO	
-	-	10	5	4	1	14	-	3	2	1	20
-	-	50	25	20	5	70	-	15	10	5	Credits %

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005

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*Syllabi of
Departmental Courses (DC) Courses
B.Tech IV Semester
(Computer Science and Engineering)
Under Flexible Curriculum
Annexure- VIII*

AS



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005
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Department of Computer Science and Engineering

COMPUTER NETWORKS

150411 (DC)

COURSE OBJECTIVES

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.

Unit-I

Introduction: Computer Network, Types- LAN, MAN & WAN, Data transmission modes- Serial & Parallel, Simplex, Half duplex & full duplex, Synchronous & Asynchronous transmission, Transmission medium- Guided & Unguided, Cables- Twisted pair, Coaxial cable & Optical fiber, Networking devices-Repeaters, Hub, Switch, Bridge, Router, Gateway, Modem, Proxy Server, Wireless router, & Wireless Access Point (WAPs). Performance Criteria- Bandwidth, Throughput, Latency (Delay), Propagation Time, Transmission time & Queuing Time, Network Standardization- OSI Reference Model & TCP/IP Reference Mode.

Unit-II

Physical Layer: Network topologies- Bus, Ring, Star Topology & Mesh, Switching- Circuit switching, Message switching & Packet switching, Multiplexing: FDM – Frequency division multiplexing, WDM – Wavelength division multiplexing & TDM – Time division multiplexing, Wireless transmission- Electromagnetic spectrum, Radio transmission & Microwave transmission.

Unit-III

Data Link Layer: Introduction, Design issues, Services, Framing, Error control, Flow control, ARQ Strategies, Error Detection and correction, Parity bits, Cyclic Redundant Code (CRC), Hamming codes, MAC Sub Layer- The channel allocation problem, Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, CSMA/CA, IEEE 802.3 frame format.

Unit-IV

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RECOMMENDED BOOKS

- Introduction to Automata Theory Language & Computation, Hopcroft & Ullman, Narosa Publication.
- Element of the Theory Computation, Lewis & Christors, Pearson.
- Theory of Computation, Chandrasekhar & Mishra, PHI.
- Theory of Computation, Wood, Harper & Row.
- Introduction to Computing Theory, Daniel I-A Cohen, Wiley.

COURSE OUTCOMES

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

- CO1. Explain the basic concepts of switching and finite automata theory & languages.
 - CO2. Relate practical problems to languages, automata, computability and complexity.
 - CO3. Construct abstract models of computing and check their power to recognize the languages.
 - CO4. Analyse the grammar, its types, simplification and normal form.
 - CO5. Interpret rigorously formal mathematical methods to prove properties of languages, grammars and automata.
 - CO6. Develop an overview of how automata theory, languages and computation are applicable in engineering application.
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Department of Computer Science and Engineering

PROGRAMMING LAB.
150415(DLC)
Python Programming

COURSE OBJECTIVES

- To understand components of Python Program
- To learn the basic construct of python programming for solving real world research-based problems.
- To visualize and analyze data using python libraries

Unit 1:

Setting up programming environment, running python programs from a terminal, variables and simple data types: variables, strings, numbers and maths, comments, conditional statements.

Unit 2:

Introducing loops, working of input function, various operations on Tuples, lists, Set and Dictionary, Loops, Conditional Statement.

Unit 3:

Built in function, defining a function, passing arguments, return value, lambda function, exception handling

Unit 4:

Object oriented programming, Creating and using class and object, methods, inheritance, debugging.

Unit 5:

Working with packages, pandas, NumPy, Matplotlib and scikit-learn

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RECOMMENDED BOOKS

- Python Crash Course: A Hands-On, Project-Based Introduction to Programming, By Eric Matthes
- Learn Python the Hard Way: 3rd Edition
- T.R. Padmanabhan, Programming with Python, Springer, 1st Ed., 2016.
- Kenneth Lambert, Fundamentals of Python: First Programs, Cengage Learning, 1st Ed., 2012.

COURSE OUTCOMES

After successful completion of course, the student will be able to:

- CO1. Tell the use of various built-in data structures used in python.
 - CO2. Outline the working of file handling operations, normal functions and lambda functions in python.
 - CO3. Apply the concepts of object oriented programming in python.
 - CO4. Analyze the data and visualize it using python's matplotlib.
 - CO5. Rule out various important characteristics of data using scikit-learn package.
 - CO6. Create efficient algorithms in python to solve real world problems.
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Department of Computer Science and Engineering

DISCRETE STRUCTURES

150416

COURSE OBJECTIVES:

- To perceive the knowledge of basic algebra
- To use logical notation to define fundamental mathematical concepts
- To familiarize predicate & propositional logic
- To know about the graph theory and its application in computer engineering
- To familiarize the discrete numeric function and generating function.

Unit 1:

Finite and infinite sets, mathematical induction, Principles of inclusion and exclusion, functions and relations, summations, binary relations, equivalence relations, Congruence Relation and partitions, partial ordering relations and lattices, Pigeonhole principle.

Unit 2:

Propositional logic, syntax, semantics of Atf (atomic formula), Wff (well formed formula's), validity and satisfiability of wff by Quine's method, Normal and closure form of propositional calculus.

Unit 3:

Basic of Graph Theory as a Discrete Structure, planner graphs, Graph Coloring, multi-graphs and weighted graph, shortest path in weighted graph, Introduction to Eularian paths and circuits, Hamiltonian paths and circuits, Introduction to trees, rooted trees, Path length in rooted trees, spanning trees and cut trees.

Unit 4:

Introduction to discrete numeric functions and generating functions, Introduction to recurrence relations, linear recurrence relations with constant coefficients, homogeneous solutions, particular solutions and total solutions.

Unit 5:

Introduction to group, subgroups, generations and evaluation of power, cosets and Lagrange's theorem, group codes, isomorphism and automorphism, homomorphism and normal sub groups, ring, integral domain and field.

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RECOMMENDED BOOKS:

- J. Tremblay and R. Manohar: Discrete Mathematical Structures with Application to Computer science. • Narsingh Deo: Graph Theory.
 - C.L.Liu: Discrete Mathematics.
 - K.H. Rosen: Discrete Mathematics and its Applications
 - S. Lipschutz, Discrete Mathematics
-

COURSE OUTCOMES:

After completing this course, the students will be able to:

- CO1.** Understand logical notation to define and reason mathematically about the fundamental data types and structures used in computer algorithms and systems.
 - CO2.** Outline various mathematical concepts along with their applications.
 - CO3.** Implement the applications of various types of graphs to solve real life problem.
 - CO4.** Apply the mathematical concepts to solve engineering problems.
 - CO5.** Analyze the set theory, propositional logic, graph theory, discrete numeric function and algebraic structure to examine the real world problem.
 - CO6.** Design analytical skill and interpret applications of engineering in real time troubleshooting.
-

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Experiment list/ Lab manual for Laboratory Courses

B.Tech IV Semester

For batch admitted 2020-21

(Computer Science and Engineering)

Annexure-IX

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Department of Computer Science and Engineering

COMPUTER NETWORKS
150411 (DC)

List of Experiments

- 1) Study of different types of network cables and practically implement cross wired cable and straight through cable using clamping tool.
- 2) Install and configure Network Devices: HUB, Switch and Routers.
- 3) Configure Internet connection and use Ipconfig, tracert, ping, arp and Netstat utilities to debug the network issues.
- 4) Configure a Network topology using simulation software.
- 5) Simulation and analysis of Error and Flow Control protocols.
- 6) Simulation & Analysis of Routing Protocols.
- 7) Network Traffic flow analysis using Wireshark utility.
- 8) Installation and working of web proxy software's (CCproxy).
- 9) Data transfer between two systems using Socket programming
- 10) Simulate stop and wait protocol using Socket programming.

Any



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Department of Computer Science and Engineering

DATABASE MANAGEMENT SYSTEM
150412 (DC)

List of Experiment

1. Implementation of DDL commands of SQL with suitable examples
 1. Create table
 2. Alter table
 3. Drop table
2. Implementation of DML commands of SQL with suitable examples
 1. Insert
 2. Update
 3. Delete
3. Implementation of different types of function with suitable examples
 1. Number function
 2. Aggregate function
 3. Character function
 4. Conversion function
 5. Date function
4. Implementation of different types of operators in SQL
 1. Arithmetic operators
 2. Logical operators
 3. Comparison operators
 4. Set operation
5. Implementation of different types of joins
 1. Inner join
 2. Outer join
 3. Natural join
6. Study and implementation of
 1. Group by and having clause
 2. Order by clause
 3. Indexing
7. Study and implementation of
 1. Sub queries
 2. Views
8. Study and implementation of different types of constraints.
9. Study and implementation of Database Backup and Recovery commands.

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10. Study and implementation of Rollback, Commit, Savepoint.

Department of Computer Science and Engineering

PROGRAMMING LAB (Python Programming)

150415(DLC)

List of Experiment

1. Write program to take input from user and display "Display Text".
2. Write program to do arithmetic operations.
3. Write program to find area of rectangle, circle and triangle.
4. Write program to check number is even or odd, prime not prime.
5. Write program find factorial of a number.
6. Write program to check year is leap year or not.
7. Write Program to implement the operation on List, Tuple, Set and Dictionary.
8. Write Program to handle the exception and file handling operation.
9. Write Program to create and use of user defined function.
10. Write Program to solve a problem using Lambda function
11. Write Program for creating an object with and without inheritance.

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Signature 47: [Handwritten signature]

Signature 48: [Handwritten signature]

Signature 49: [Handwritten signature]

Signature 50: [Handwritten signature]

Signature 51: [Handwritten signature]

Signature 52: [Handwritten signature]

Signature 53: [Handwritten signature]

Signature 54: [Handwritten signature]

Signature 55: [Handwritten signature]

Signature 56: [Handwritten signature]

Signature 57: [Handwritten signature]

Signature 58: [Handwritten signature]

Signature 59: [Handwritten signature]

Signature 60: [Handwritten signature]

Signature 61: [Handwritten signature]

Signature 62: [Handwritten signature]

Signature 63: [Handwritten signature]

Signature 64: [Handwritten signature]

Signature 65: [Handwritten signature]

Signature 66: [Handwritten signature]

Signature 67: [Handwritten signature]

Signature 68: [Handwritten signature]

Signature 69: [Handwritten signature]

Signature 70: [Handwritten signature]

Signature 71: [Handwritten signature]

Signature 72: [Handwritten signature]

Signature 73: [Handwritten signature]

Signature 74: [Handwritten signature]

Signature 75: [Handwritten signature]

Signature 76: [Handwritten signature]

Signature 77: [Handwritten signature]

Signature 78: [Handwritten signature]

Signature 79: [Handwritten signature]

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Signature 81: [Handwritten signature]

Signature 82: [Handwritten signature]

Signature 83: [Handwritten signature]

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Signature 86: [Handwritten signature]

Signature 87: [Handwritten signature]

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Skill Based Mini Projects
B.Tech IV Semester
For batch admitted 2020-21
(Computer Science and Engineering)
Annexure-X

Dr. P. P. Singh



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005
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Department of Computer Science and Engineering

COMPUTER NETWORKS
150411 (DC)

List of Skill Based Project

- 1) Design and demonstrate the operation of the Ethernet network to examine the performance of the Ethernet network under different scenario using the NET Simulator.
- 2) Design and demonstrate the implementation of a token ring network to examine the performance of the token ring network under different scenarios with the use of Net Simulator.
- 3) Design and demonstrate the basics of designing a network, taking into consideration the users, services, and locations of the hosts.
- 4) Configure and analyze the performance of the Open Shortest Path First (OSPF) routing protocol with the use of NET Simulator.
- 5) Design and demonstrate the congestion control algorithms implemented by the Transmission Control Protocol (TCP).
- 6) Examine the effect of different queuing disciplines on packet delivery and delay for different services using the NET Simulator.

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Department of Computer Science and Engineering

DATABASE MANAGEMENT SYSTEM
150412 (DC)

List of Skill Based Project

1. Blood Bank Management System .
2. Railway Management System .
3. Airlines Management System .
4. Courier Service Management System .
5. Attendance Management System .
6. Inventory Management System .
7. University Management System .
8. Online Shopping Management System .
9. Dispensary Management System .
10. Taxi Management System .
11. Retail Shop Management System .
12. Stadium Seat Booking Management System .

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Department of Computer Science and Engineering

PROGRAMMING LAB.
150415(DLC)
Python Programming

List of Program

1. Visualize the Publically available real world data set using various function and identify the suitable plot for better representation.
2. Handle the missing data and categorical value in a real world Data Set.
3. Build a prediction model based on Classification Data Set
4. Build a prediction model based on Regression Data Set
5. Build a prediction model based on Clustering Data Set

Aug. 2021
B. M. S.
B. M. S.
R. D.

B. Tech in Computer Science and Design

Scheme of

B.Tech I Semester

For batch admitted 2021-22

(Computer Science and Design)

Annexure-XI

B. Tech in Computer Science and Design

I Semester

For Batches admitted in Academic Session 2021-22 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem Exam	Continuous Evaluation								
				End Sem. Exam	Proficiency in subject/course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	290101	DC	Introduction to Computer Science and Design	50	10	20	20	-	-	-	100	4	-	-	4	Blended (3/1)	MCQ
2.	230102	DC	Introduction to computer programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	AO
3.	100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	MCQ
4.	250100	BSC	Linear Algebra	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP
5.	100015	HSMC	Energy, Environment, Ecology & Society	50	10	20	20	-	-	-	100	3	-	-	3	Online	MCQ
Total				250	50	100	100	120	40	40	700	14	3	4	19		

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

*Proficiency in course/subject - includes the weightage towards ability/skill/competence/knowledge level/expertise attained etc. in that particular course/subject

MCQ: Multiple Choice Question AO: Assignment + Oral

OB: Open Book

PP: Pen Paper

SO: Submission & Oral

CLC: College level course

Mode of Teaching						Mode of Examination					Total Credits
Theory		Blended		Lab	NEC	Theory			Lab	SIP/SLP/NEC	
Offline	Online	Offline	Online	Offline	Interactive	PP	A+O	MCQ	SO	SO	
4	3	7	3	2	-	4	4	11	-	-	
21.05	15.78	36.84	15.78	10.52	-	21.05	21.05	57.89	-	-	Credits %

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Syllabus of
B.Tech I Semester
For batch admitted 2021-22
(Computer Science and Design)
Annexure-XII

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

INTRODUCTION TO COMPUTER SCIENCE AND DESIGN

290101

COURSE OBJECTIVES:

- To understand the basics of computers.
- To familiarize the students with various design techniques.
- To implement design solutions using digital logic, algorithms, computer networks and software development techniques.

Unit I

Introduction to computers, Generation of computers, Classification of Computers, Hardware components, system bus. Computer memory and its types - RAM, ROM, Cache memory, Registers, secondary memory, memory hierarchy. Computer software - System software, application software. Operating system, its types and services. Booting.

Unit II

Von-Neumann Model, Various Subsystems, Binary numbers, Number Base Conversions, Complements, Signed Binary numbers, Binary Codes, Representation of sign (sign magnitude, two's complement). Boolean algebraic axioms, Boolean functions, truth tables.

Unit III

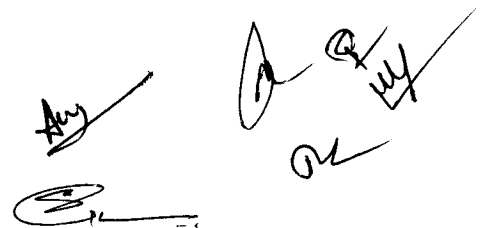
Fundamentals of Algorithm, Problem Solving, Characteristics, need for algorithms, Important Problem Types, Flowcharts for different problems.

Unit IV

Introduction to computer network, Types- LAN, MAN & WAN, Topologies, Serial & Parallel transmissions, Simplex, Half duplex & full duplex modes of transmission, Connecting Devices – Repeaters, Hub, Switch, Bridge, Router, Gateway and Modem.

Unit V

Introduction to Software, Types, Characteristics. Software development life cycle (SDLC), The World Wide Web, Web Browsers, Uniform Resource Locators(URL), Domain Name System (DNS), HTML, Basic Text Markup, Lists, Tables, Forms, Hyperlinks, Multimedia.



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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

RECOMMENDED BOOKS:

- Fundamentals of Computer Engineering, E. Balagurusamy, Tata McGraw Hill Education Pvt. Ltd.
 - Introduction of Computers : Peter Norton, TMH
 - Computer Networks: Andrew Tananbaum, PHI
 - Basic Computer Engineering: Silakari and Shukla, Wiley India
-

COURSE OUTCOMES:

After completion of the course students would be able to:

CO1: Define the fundamentals of computer systems.

CO2: Outline various components of the computer system.

CO3: Analyse basics of digital circuit design techniques.

CO4: Design algorithms for solving problems using computers.

CO5: Explain the importance of computer networks.

CO6: Choose suitable development tools to create web based applications for solving real world problems.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Scheme of

B.Tech First Semester

For batch admitted 2020-21

(Computer Science & Engineering)

Under Flexible Curriculum

[Item-15]

Annexure-XIII



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IT WORKSHOP (150112)

COURSE OBJECTIVES:

- To Understand the basics principles of computer, internet and computer security
 - To Understand the basic productive IT tools
 - To Learn the language of the web: HTML & CSS
 - To learn and understand Python programming basics and paradigm
-

UNIT I

Introduction & evolution of internet, Study of various internet based services like Email, social network, chat, web browsers, google services etc. Introduction to cyber security and cyber laws, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks.

UNIT II

Professional word documents excel spread sheets and power point presentations using the Microsoft suite of office tools, Operating System and Software Installations: Introduction to operating system. Operating system types & evolution of operating system, Introduction to software, Types of software i.e., MS office, Media players, Winrar etc.

UNIT III

Introduction to html, html text editors, html building blocks, html tags, html attributes, html elements, html formatting, html heading, html paragraphs, html phrase tags, html anchors, html images, html tables, html list, html form, html with CSS, html classes, html frames, html Java scripts

UNIT IV

Introduction to python, Unique features of Python, Python-2 and Python-3 differences, Install Python and Environment Setup, First Python Program, Python Identifiers, Keywords and Indentation, Comments and document interlude in Python, Command line arguments.

UNIT V

Getting User Input, Python Data Types, What are variables?, Python Core objects and Functions, Number and Math's, Control Statements, List, Python Dictionaries and Sets, Input

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and Output in Python, Python built in function, Case study using HTML, Case study using Python.

RECOMMENDED BOOKS:

[1]. VamsiKurama, "Python Programming: A Modern Approach", Pearson India, 2017. [2]. Charles Severance, " Python for Informatics- Exploring Information", 1st edition Shroff Publishers, 2017.

[2] Thomas A. Powell " The complete references HTML and CSS", Fifth edition, Mc Graw Hill Publication.

COURSE OUTCOMES:

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

CO1: Understand the basic concept and structure of application software.

CO2: Identify the existing configuration of the computers and peripherals.

CO3: Integrate the PCs into local area network and re-install operating system and various application programs.

CO4: Design and develop basic web pages using HTML and CSS.

CO5: Design & create and implement a static and dynamic webpage

CO6: Design and implement a program to solve a real world problem.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal, M.P.)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IT WORKSHOP

List of Experiments

- 1) Apply following operation on Excel Spreadsheet
 - Deleting a Column or a Row
 - Inserting a Row
 - Sorting
 - Displaying Formulas in the Worksheet
 - Copying Cells, Columns or Rows
 - Justification of Cell Contents
- 2) Perform following Function on Excel Spreadsheet
 - AutoSum
 - Max
 - Min
 - Average
- 3) Write a program to describe various text formatting commands.
- 4) Create HTML Login form.
- 5) Create google form for registration of students using google services.
- 6) Write a Program to create a simple layout of Webpage.
- 7) Write a Program to divide a page into Frames.
- 8) Write python program to swap two variable without using temporary variable.
- 9) Write a program two find largest number among three numbers.
- 10) Write a Python programs that makes use of conditional and control flow structures

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

IT WORKSHOP

SKILL BASED PROJECTS

1. Design & implement a login form in html.
2. Design & implement a registration form for college event.
3. Design & implement your dynamic portfolio page.
4. Create an animation with the help of html & CSS..
5. Create a Google classroom for your subject.
6. Design & implement a calculator in python.
7. Create your blog by using Google blogger.
8. Create YouTube channel or monetization it.
9. Create an alarm by python.
10. Create a Quiz game in python.













Scheme of
B.Tech II Semester
For batch admitted 2021-22
(Computer Science and Design)
Annexure-XIV

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

Syllabi of
Departmental Courses (DC) Courses
B.Tech II Semester
For batch admitted 2021-22
(Computer Science and Design)
Under Flexible Curriculum

Annexure-XV

B. Tech in Computer Science and Design**II Semester**

For Batches admitted in Academic Session 2021-22

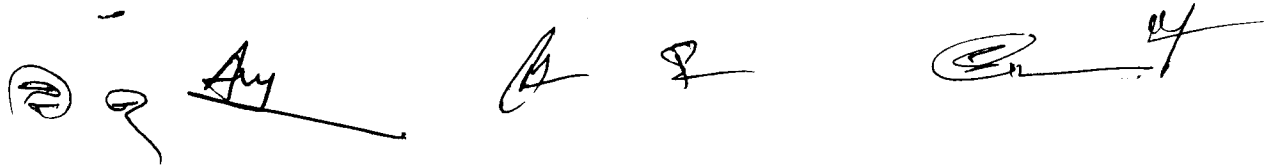
S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem Exam	Continuous Evaluation								
				End Sem. Exam	^s Proficiency in subject /course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	250106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP
2.	290201	DC	Digital Electronics	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
3.	290202	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
4.	290203	DC	Object Oriented Programming and Methodology	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	AO
5.	100016	HSMC	Technical Language	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
6.	100017	HSMC	Language Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
Total				250	50	100	100	180	60	60	800	13	3	6	19		

Summer Internship Project – I (Institute Level) (Qualifier): Minimum two-week duration: Evaluation in III Semester.

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission & Oral CLC: College level course, 01 Theory Period=1 Credit; 02 Practical Periods =1 Credit

^sProficiency in course/subject – includes the weightage towards ability/ skill/ competence /knowledge level /expertise attained /attendance ,one minute paper writing etc. in that particular course/subject

Mode of Teaching						Mode of Examination					Total Credits
Theory		Blended	Lab	NEC	SIP/SLP/NEC	Theory			Lab	SIP/SLP/NEC	
Offline	Online					Offline	Interactive	PP			
4	-	4	3	-	14	4	-	1	-		
21	-	42	15	-	74	21	-	5	-	19	
										Credits %	



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Unit-V

Graphs: Background, graph theory terminologies, representation of graphs- sequential & linked representation, path matrix, graph traversals- BFS, DFS, spanning trees, applications of graph.

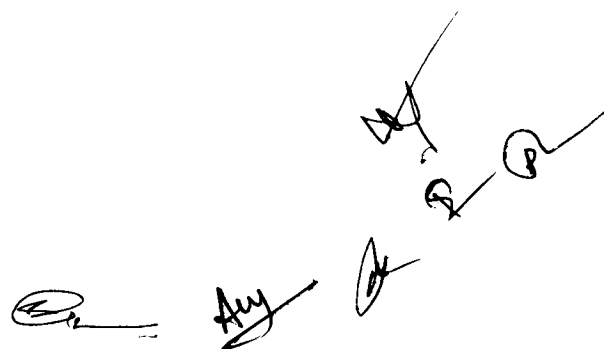
RECOMMENDED BOOKS

- Data Structures, Algorithms and Applications in C++, Sartaj Sahni, 2nd Edition.
 - An Introduction to Data Structures with Applications, Jean-Paul Tremblay, Mcgraw hill.
 - Data Structures & Algorithms, Aho, Hopcroft & Ullman, original edition, Pearson Publication.
-

COURSE OUTCOMES

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

- CO1. outline the basics of Algorithms and their performance criteria's.
 - CO2. explain the working of linear/Non Linear data structures.
 - CO3. identify the appropriate data structure to solve specific problems.
 - CO4. analyze the performance of various Data Structures & their applications.
 - CO5. evaluate the time/space complexities of various data structures & their applications.
 - CO6. design the optimal algorithmic solutions for various problems.
-

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OBJECT ORIENTED PROGRAMMING AND METHODOLOGY
290203 (DC-3)

COURSE OBJECTIVES

- To study about the concept of object oriented programming.
 - To create C++ programs that leverage the object oriented features of the C++ Language.
 - To apply object oriented or non-object oriented techniques to solve bigger computing problems.
-

Unit-I

Introduction to C++ and Object Oriented Concepts: Basics of C++, Tokens, I/O Statements, Structure of Program, Operators and Expressions, Flow of Control, Arrays, Structures, Functions and its type, Function Prototyping, Pointers, Pointer Variables, Pointers and Arrays, Array of Pointers, Pointers and Structures, Dynamic Memory Allocation.

Programming Techniques: Unstructured & Structured Programming, Object Oriented Paradigm, Features of OOPS, Comparison with Procedural Oriented Programming & Object Oriented Programming, Abstract Data Types, Reference Variable, Scope Resolution Operator.

Unit-II

Classes & Objects: Specification of Class, Visibility Modes: Private, Public, Protected, Defining Member Functions, Creating of Objects, Characteristics of Object, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Default Arguments, Friend Function, Recursion.

Constructors and Destructors: Introduction, Types of Constructors- Default Constructor, User Defined Constructor, Parameterized Constructor, Copy Constructor, Constructor with Default Arguments, Rules of Constructor Definition and Usage, Destructors.

Unit-III

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading: Binary Operators, Arithmetic Assignment Operators, Unary Operators, Rules for Operator Overloading, Pitfalls of Operator Overloading, Data Conversion, Type Casting.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Unit-IV

Inheritance: Introduction to Code Reuse, Visibility Modes. Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath. Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes, Overriding Member Function. Containership: Classes with in Classes, Function Overriding.

Unit-V

Pointer & File Concept: Pointers Overview, Pointers to Objects. This Pointer, Pointers to Derived Classes, Virtual Functions & Pure Virtual Function, Association, Type of Association, Aggregation, File Concepts, Study of Various Files and Streams, Opening and Closing of Files- Functions Get(), Getline(), Put(), Opening The Files Using Function Open(), File Manipulator Function.

RECOMMENDED BOOKS

- C++ How to Program, H M Deitel and P J Deitel, Prentice Hall.
- Programming with C++, D Ravichandran, T.M.H.
- Computing Concepts with C++ Essentials. Horstmann, John Wiley.
- The Complete Reference in C++, Herbert Schildt, TMH.
- Object-Oriented Programming in C++, E Balagurusam.
- Fundamentals of Programming C++, Richard L. Halterman.

COURSE OUTCOMES

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

CO1. tell the concepts of classes & objects and their significance in real world.

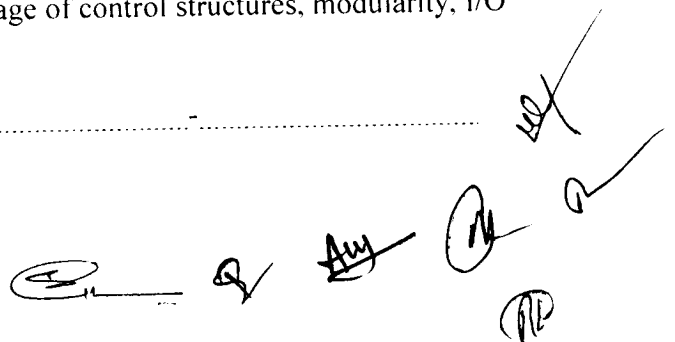
CO2. explain the benefits of object oriented design.

CO3. build C++ classes using appropriate encapsulation and design principles.

CO4. analyze the utilization of inheritance and polymorphism in the solution of problems.

CO5. choose appropriate object orient programming concepts for solving real world problems.

CO6. develop solutions to problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Skill Based Mini Projects
B.Tech II Semester
For batch admitted 2021-22
(Computer Science and Design)
Annexure-XVI

Data Structures (290202)

List of Experiment

Write C/C++ Programs to illustrate the concept of the following:

1. Implementation of Array and linked list.
2. Implementation of Sorting Algorithms-Non-Recursive and Recursive.
3. Implementation of Searching Algorithms-Linear and Binary Search.
4. Implementation of Stack using Array.
5. Implementation of Queue using Array.
6. Implementation of Circular Queue using Array.
7. Implementation of Stack using Linked List.
8. Implementation of Queue using Linked List.
9. Implementation of Circular Queue using Linked List.
10. Implementation of Tree Structures, Binary Tree, Tree Traversal, Binary Search Tree, Insertion and Deletion in BST.
11. Graph Implementation, BFS, DFS, Minimum cost spanning tree, shortest path algorithm.

Handwritten signatures and initials at the bottom of the page, including a large signature on the left, a smaller one in the middle, and a circular stamp on the right.

Object Oriented Programming & Methodology (290203)

List of Experiment

1. Write a program to swap two integers without using third variable. The swapping must be done in a function of a particular class.
2. Write a program that uses a class where the member functions are defined outside a class.
3. Design a class to represent a bank account. Which includes account number, name of the depositor, type of the account, balance amount in the account. Define Methods, to assign initial values, to Deposit an amount, to Withdraw amount after checking balance, to display name and balance.
4. Write a program to find the greater of two given numbers in two different classes using friend function.
5. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.
6. Create two classes: Polar and Cartesian, to represent Polar and Cartesian coordinates of a point. Demonstrate how to convert Polar coordinates to Cartesian coordinates by writing the conversion code in source class.
7. Write a program to demonstrate anomaly caused in Multi-path Inheritance. Also, write a program to overcome the anomaly.
8. Create an abstract class Shape which has a field P1=3.14 as final and it has an abstract method Volume. Make two sub-classes 'Cone' and 'Sphere' from this class and they should print their volume.
9. Create a class called LIST with two pure virtual function store() and retrieve(). To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
10. Write a program to demonstrate working of various file handling operations in C++.

The bottom right corner of the page contains several handwritten signatures and initials in black ink. There are four distinct marks: a large stylized signature, a smaller signature, a signature that appears to be 'Ajay', and a circled initial 'T'.

Data Structure (290202)

SKILL-BASED MINI-PROJECTS

1. Linked-list based project:

1. Cyclic double list
2. Cyclic double sentinel list
3. Cyclic list
4. Cyclic sentinel list
5. Double list
6. Double sentinel list
7. Sentinel list
8. Single list
9. Sorted double list
10. Sorted double sentinel list
11. Sorted sentinel list
12. Sorted single list

2. Array-based projects

1. Drop off stack
2. Navigation stack
3. Range stack
4. Dual stack
5. Dynamic stack
6. Dynamic queue
7. Dynamic deque

3. Tree-based projects

1. AVL tree
2. B tree
3. Expression tree
4. File system
5. Lazy deletion tree
6. Quad tree

4. Graph based projects

1. Dijkstra's algorithm
2. Prim's algorithm
3. Topological sort
4. Kruskal algorithm

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Object Oriented Programming & Methodology (290203)

SKILL-BASED MINI-PROJECTS

1. 'Movie World' Shop has a huge collection of movies (in the form of DVDs). You are required to make software using OOPS paradigm that manages the rental operations of movies.
2. Question Bank computerizes the MCQ based exams. It takes input from a file having questions and their answers and presents randomly before the exam takers. Use OOPS concepts to implement the question bank system.
3. Design an OOPS to implement the basic operations of Leave Management System.
4. An Inventory System computerizes the Stock, Sale and Purchase of goods. Design an OOPS to implement it.
5. An electricity board charges the following rates to domestic users to discourage large consumption of energy: For the first 100 units - 60P per unit For next 200 units - 80P per unit Beyond 300 units - 90P per unit All users are charged a minimum of Rs.50.00. if the total amount is more than Rs.300.00 than an additional surcharge of 15% is added. Design an OOPS system to register users to the system, maintain his/her record and display monthly bills.
6. Library Systems is aimed to computerize the library management operations, e.g. Registering a Student, Issuing a book, Handling Books Return, etc. Design an OOPS system to implement the same.
7. Design an OOPS to implement a Personal Diary Management System.

Please Note: Each project has to be submitted by a group of 3 to 4 students, and each group will be assigned only one project.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of
B.Tech II Semester
For batch admitted 2021-22
(Computer Science and Engineering)
Annexure-XVII

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination
 B.Tech. II Semester (Computer Science and Engineering)

For batches admitted in Academic Session 2021-22

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per Week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam
				Theory Slot				Practical Slot				L	T	P			
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.	Lab work / Sessional	S Skill Base mini Project								
										End Term Evaluation							
1.	100011	BSC	Engineering Mathematics –I	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP
2.	150211 150214	DC	Data Structures	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
3.	150212	DC	Object Oriented Programming & Methodology	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	A+O
4.	150213	DC	Digital Electronics	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
5.	100016	HSMC	Technical Language	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
6.	100017	HSMC	Language Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
Total				250	50	100	100	180	100	60	800	13	03	06	19		

Summer Internship Project – I (Institute Level) (Qualifier): Minimum two-week duration: Evaluation in III Semester.

01 Theory Period=1 Credit; 02 Practical Periods =1 Credit

*Proficiency in course/subject – includes the weightage towards ability/ skill/ competence /knowledge level /expertise attained /attendance etc. in that particular course/subject

Mode of Teaching				Mode of Examination				Total Credits	
Theory		Blended		Lab	Theory				Lab
Offline	Online	Offline	Online	Offline	PP	A+O	MCQ		SO
4	-	8	4	3	14	4	-	1	
21.0	-	42.10	21.0	15.78	73.68	21.0	-	5.26	
Credits %									

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

Syllabi of
Departmental Courses (DC) Courses
B.Tech II Semester
For batch admitted 2021-22
(Computer Science & Engineering)
Under Flexible Curriculum
Annexure- XVIII

DATA STRUCTURES
150211 (DC-1)

COURSE OBJECTIVES

- To be familiar with the use of data structures as the foundational base for computer solutions to problems.
 - To understand various techniques of searching and sorting.
 - To understand basic concepts about stacks, queues, lists, trees and graphs.
-

Unit-I

Introduction to Data Structures: Algorithms & their characteristics, asymptotic notations, arrays and its representations, index to address translation. **Link list:** Introduction, implementation of linked list, operations, circular link list, doubly linked list, polynomial manipulation using linked list.

Unit-II

Stacks: Concepts and implementation of stacks, operations on stack, conversion of infix to postfix notation, evaluation of postfix expression, recursion.


Queues: Concepts and implementation, operations on queues, dequeue, priority queues, circular queues and application.

Unit-III

Trees: Types, terminology, binary tree -representations, traversal, conversion of general tree to binary tree, binary search tree, threaded binary tree and height balanced tree.

Unit-IV

Searching & Sorting: Linear search, binary search, bubble sort, selection sort, insertion sort, quick sort, merge sort, radix sort and heap sort, comparison between sorting techniques, hashing and collision resolution techniques.







MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Unit-V

Graphs: Background, graph theory terminologies, representation of graphs- sequential & linked representation, path matrix, graph traversals- BFS, DFS, spanning trees, applications of graph.

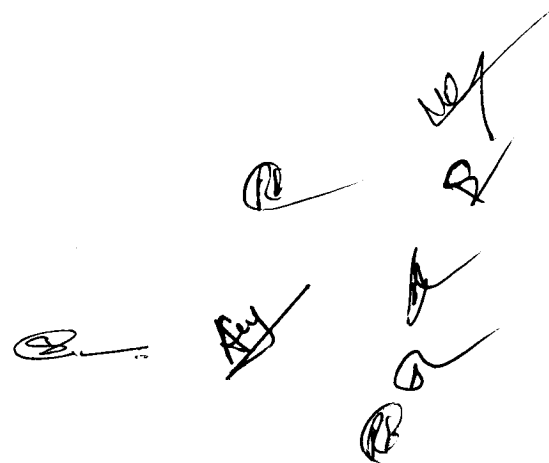
RECOMMENDED BOOKS

- Data Structures, Algorithms and Applications in C++, Sartaj Sahni, 2nd Edition.
 - An Introduction to Data Structures with Applications, Jean-Paul Tremblay, Mcgrawhill.
 - Data Structures & Algorithms, Aho, Hopcroft & Ullman, original edition, Pearson Publication.
-

COURSE OUTCOMES

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

- CO1. outline the basics of Algorithms and their performance criteria's.
 - CO2. explain the working of linear/Non Linear data structures.
 - CO3. identify the appropriate data structure to solve specific problems.
 - CO4. analyze the performance of various Data Structures & their applications.
 - CO5. evaluate the time/space complexities of various data structures & their applications.
 - CO6. design the optimal algorithmic solutions for various problems.
-



OBJECT ORIENTED PROGRAMMING AND METHODOLOGY
150212 (DC-2)

COURSE OBJECTIVES

- To study about the concept of object oriented programming.
 - To create C++ programs that leverage the object oriented features of the C++ Language.
 - To apply object oriented or non-object oriented techniques to solve bigger computing problems.
-

Unit-I

Introduction to C++ and Object Oriented Concepts: Basics of C++, Tokens, I/O Statements, Structure of Program, Operators and Expressions, Flow of Control, Arrays, Structures, Functions and its type, Function Prototyping, Pointers, Pointer Variables, Pointers and Arrays, Array of Pointers, Pointers and Structures, Dynamic Memory Allocation.

Programming Techniques: Unstructured & Structured Programming, Object Oriented Paradigm, Features of OOPS, Comparison with Procedural Oriented Programming & Object Oriented Programming, Abstract Data Types, Reference Variable, Scope Resolution Operator.

Unit-II

Classes & Objects: Specification of Class, Visibility Modes: Private, Public, Protected, Defining Member Functions, Creating of Objects, Characteristics of Object, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Default Arguments, Friend Function, Recursion.

Constructors and Destructors: Introduction, Types of Constructors- Default Constructor, User Defined Constructor, Parameterized Constructor, Copy Constructor, Constructor with Default Arguments, Rules of Constructor Definition and Usage, Destructors.

Unit-III

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading: Binary Operators, Arithmetic Assignment Operators, Unary Operators, Rules for Operator Overloading, Pitfalls of Operator Overloading, Data Conversion, Type Casting.

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DIGITAL ELECTRONICS
150213 (DC-3)

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 and flip-flops.
-

Unit-I

Introduction to Digital Electronics, Needs and Significance, Different Number System: Binary Numbers, Octal and Hexadecimal Numbers, Conversions, Complement's, Signed Binary Numbers, Binary Arithmetic's, 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 simplifications. Prime Implicants and Essential Prime Implicants definition.

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

Unit-V

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

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RECOMMENDED BOOKS

- Digital Design, Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications, Anil K. Maini, Wiley.

COURSE OUTCOMES

After completion of the course students would 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.
 - CO3. develop the understanding of combinational circuits.
 - CO4. analyze the basic concept of sequential circuits.
 - CO5. compare various memories.
 - CO6. solve the boolean functions using logic gates.
-

Handwritten signatures and initials:
A. S. Singh
B. K. Singh
R. K. Singh

List of Experiments
and
Skill Based Mini Projects
B.Tech II Semester
For batch admitted 2021-22
(Computer Science and Engineering)
Annexure-XIX

Department of Computer Science and Engineering

Data Structures (150211)

List of Experiment

Write C/C++ Programs to illustrate the concept of the following:

1. Implementation of Array and linked list.
2. Implementation of Sorting Algorithms-Non-Recursive and Recursive.
3. Implementation of Searching Algorithms-Linear and Binary Search.
4. Implementation of Stack using Array.
5. Implementation of Queue using Array.
6. Implementation of Circular Queue using Array.
7. Implementation of Stack using Linked List.
8. Implementation of Queue using Linked List.
9. Implementation of Circular Queue using Linked List.
10. Implementation of Tree Structures, Binary Tree, Tree Traversal, Binary Search Tree, Insertion and Deletion in BST.
11. Graph Implementation, BFS, DFS, Minimum cost spanning tree, shortest path algorithm.

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Department of Computer Science and Engineering

Object Oriented Programming & Methodology (150212)

List of Experiment

1. Write a program to swap two integers without using third variable. The swapping must be done in a function of a particular class.
2. Write a program that uses a class where the member functions are defined outside a class.
3. Design a class to represent a bank account. Which includes account number, name of the depositor, type of the account, balance amount in the account. Define Methods, to assign initial values, to Deposit an amount, to Withdraw amount after checking balance, to display name and balance.
4. Write a program to find the greater of two given numbers in two different classes using friend function.
5. Create an inheritance hierarchy of Rodent, Mouse, Gerbil, Hamster etc. In the base class provide methods that are common to all Rodents and override these in the derived classes to perform different behaviors, depending on the specific type of Rodent. Create an array of Rodent, fill it with different specific types of Rodents and call your base class methods.
6. Create two classes: Polar and Cartesian, to represent Polar and Cartesian coordinates of a point. Demonstrate how to convert Polar coordinates to Cartesian coordinates by writing the conversion code in source class.
7. Write a program to demonstrate anomaly caused in Multi-path Inheritance. Also, write a program to overcome the anomaly.
8. Create an abstract class Shape which has a field P1=3.14 as final and it has an abstract method Volume. Make two sub-classes 'Cone' and 'Sphere' from this class and they should print their volume.
9. Create a class called LIST with two pure virtual function store() and retrieve(). To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
10. Write a program to demonstrate working of various file handling operations in C++.

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A signature with a circle around the first letter.
A signature with a circle around the first letter and a diagonal line through it.
A signature with a circle around the first letter and a diagonal line through it.

Department of Computer Science and Engineering

Data Structure (150211)

SKILL-BASED MINI-PROJECTS

1. Linked-list based project:

1. Cyclic double list
2. Cyclic double sentinel list
3. Cyclic list
4. Cyclic sentinel list
5. Double list
6. Double sentinel list
7. Sentinel list
8. Single list
9. Sorted double list
10. Sorted double sentinel list
11. Sorted sentinel list
12. Sorted single list

2. Array-based projects

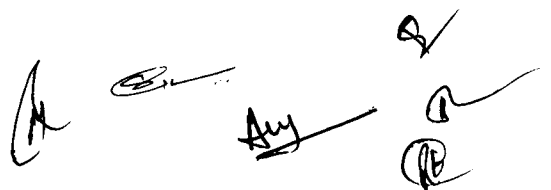
1. Drop off stack
2. Navigation stack
3. Range stack
4. Dual stack
5. Dynamic stack
6. Dynamic queue
7. Dynamic deque

3. Tree-based projects

1. AVL tree
2. B tree
3. Expression tree
4. File system
5. Lazy deletion tree
6. Quad tree

4. Graph based projects

1. Dijkstra's algorithm
2. Prim's algorithm
3. Topological sort
4. Kruskal algorithm



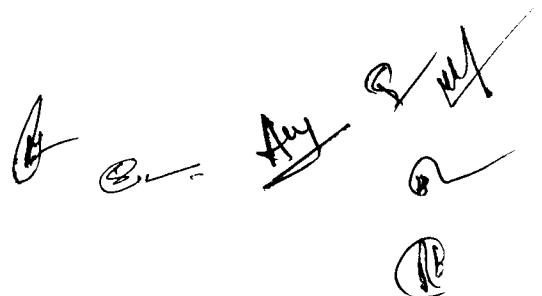
Department of Computer Science and Engineering

Object Oriented Programming & Methodology (150212)

SKILL-BASED MINI-PROJECTS

1. 'Movie World' Shop has a huge collection of movies (in the form of DVDs). You are required to make software using OOPS paradigm that manages the rental operations of movies.
2. Question Bank computerizes the MCQ based exams. It takes input from a file having questions and their answers and presents randomly before the exam takers. Use OOPS concepts to implement the question bank system.
3. Design an OOPS to implement the basic operations of Leave Management System.
4. An Inventory System computerizes the Stock, Sale and Purchase of goods. Design an OOPS to implement it.
5. An electricity board charges the following rates to domestic users to discourage large consumption of energy: For the first 100 units - 60P per unit For next 200 units - 80P per unit Beyond 300 units - 90P per unit All users are charged a minimum of Rs.50.00. if the total amount is more than Rs.300.00 than an additional surcharge of 15% is added. Design an OOPS system to register users to the system, maintain his/her record and display monthly bills.
6. Library Systems is aimed to computerize the library management operations, e.g. Registering a Student, Issuing a book, Handling Books Return, etc. Design an OOPS system to implement the same.
7. Design an OOPS to implement a Personal Diary Management System.

Please Note: Each project has to be submitted by a group of 3 to 4 students, and each group will be assigned only one project.

Handwritten signatures and initials in black ink, including a large signature on the left, a signature in the middle, and several initials on the right.