# Madhav Institute of Technology & Science, Gwalior- 474 005

**(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)**

**Computer Science Engineering** **Year 2017-2021**

| Semester | | Course Outcome |
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| Semester 1 | | **100202:Energy, Environment, Ecology & Society** |
| | CO1 | Describe various energy resources, their conversion to electrical power and role in technological & economic development. |
| | CO2 | Update with national/international power status and renewable power development targets & mis-sions. |
| | CO3 | Recognize the impact of pollution on the ecosystem and control policies adopted at national/international levels. |
| | CO4 | Illustrate the concepts of ecosystems and their conservation. |
| | CO5 | Solve practical problems of society in a sustainable and ethical manner. |
| | CO6 | Fulfill professional duties keeping in mind the environmental safety, health, and welfare of public. |
| | | **100203: Basic Computer Engineering** |
| | CO1 | Demonstrate the fundamentals of computer programming |
| | CO2 | Read, understand and trace the execution of program |
| | CO3 | Develop Conditional and Iterative Statements |
| | CO4 | Design the program using functions |
| | CO5 | Implement the programs using Derived and User defined data types |
| | CO6 | Design program for a given problem using computer programming |
| Semester 3 | | **1100001:Engineering Mathematics-II** |
| | CO1 | Retrieve the engineering application problems to related course content |
| | CO2 | Describe the basic concept of Complex Variable , Linear Programming Problem and Numerical Methods |
| | CO3 | Classify Complex Variable , Linear Programming Problem and Numerical Methods so as to apply the knowledge in solving routine |
| | CO4 | Inculcate analytical and computational skill to interpret the topics for engineering problems |
| | CO5 | Analyze the Complex Variable, Linear Programming Problem and Numerical Methods to examine the real world problem |
| | CO6 | Evaluate and Implement suitable techniques relevant for industries and contribute to the society |
| | | **150301:Digital Electronics** |
| | CO1 | Illustrate various number systems, Binay codes and its application in digital design. |
| | CO2 | Identify the logic functions, circuits, truth tables and also apply the laws of Boolean algebra to simplify circuits and expressions. |
| | CO3 | Develop the formal procedures for the analysis and design of combinational circuits. |
| | CO4 | Analyse sequential circuit's components and their usability in digital circuits. |
| | CO5 | Compare the concept of memories, programmable devices and digital ICs. |
| | C06 | Design and analyze circuits for digital arithmetic. |
| | | **150302: Data Structures** |
| | CO1 | Outline the basics of algorithms and their performance criteria. |
| | CO2 | Explain the working of linear and non-linear data structures. |
| | CO3 | Identify the appropriate data structure to solve the specific problems. |
| | CO4 | Analyse the performance of various data structures and their applications. |
| | CO5 | Evaluate the time and space complexities of various data structures and their applications. |
| | C06 | Design the optimal algorithmic solutions for various problems |
| | | **150303:Computer Graphics** |
| | CO1 | Illustrate the fundamental concepts of Computer Graphics, hardware & software components and its applications. |
| | CO2 | Explain various graphical image genration & manipulation methods and algorithms. |
| | CO3 | Apply various methods of generation & manipulation of images for creating graphical images and color models. |
| | CO4 | Explain various rendering, illumination and color models of realistic image or pictures using image processing techniques. |
| | CO5 | Discuss various methods to create natural seen & realistic images in 2D &3D space. |
| | CO6 | Design & analysis of various graphical image processing techniques and animation. |
| | | **150304: Object Oriented Programming & Methodology** |
| | CO1 | Relate the concepts and significance of OOPs in real world. |
| | CO2 | Demonstrate adeptness of object oriented programming to solve problems using Object oriented concepts |
| | CO3 | Apply object oriented programming to develop solutions of problems using standard language constructs. |
| | CO4 | Analyze data flow diagrams and flow charts for small/ moderate problems |
| | CO5 | Determine how to simulate the problem in field of Operating system, Computer networks and real world problems. |
| | CO6 | Develop software using concepts of objects, associations and integrity constraint. |
| | | **150305: Hardware LAB** |
| | CO1 | Explain basics of different computer peripherals and interfaces. |
| | CO2 | Demonstrate architecture of various computer hardware devices and their functioning. |
| | CO3 | Demonstrate the details of system buses, memory system, and I/O interfaces. |
| | CO4 | Identify the existing configuration of the computers peripherals and creating wireless network through the access point. |
| | CO5 | Analyze progress in contemporary peripherals and bus systems. |
| | CO6 | construct a networking based on IPv4 address scheme. |
| | | **100004:Cyber Security** |
| | CO1 | Tell the basic terminologies of cyber security |

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| Semester-4 | CO2 | Explain the basic concepts of Networking and Internet |
| | CO3 | Apply various methods used to protect data in the internet environment in real world situations |
| | CO4 | Discover the Concepts of IP security and Architecture |
| | CO5 | Compare various types of Cyber Security Threats/ Vulnerabilities |
| | CO6 | Develop the understanding of Cyber Crime Investigation and IT Act 2000 |
| | | **150401:Design & Analysis of Algorithms** |
| | CO1 | Define the basic properties of algorithm. |
| | CO2 | Analyze the complexity of an algorithm. |
| | CO3 | Apply mathematical preliminaries to analyse and design stages of different types of algorithms. |
| | CO4 | Examine algorithms for a number of important computational problems. |
| | CO5 | Compare different design techniques to develop algorithms for various computational problems. |
| | CO6 | Build the general principles and good algorithm design techniques to develop efficient computer algorithms. |
| | | **150402:Database Management System** |
| | CO1 | Demonstrate the concepts of different type of database system. |
| | CO2 | Apply Relational algebra concepts to design database system. |
| | CO3 | Make use of queries to design and access database system. |
| | CO4 | Analyze the evaluation of transaction processing and concurrency control. |
| | CO5 | Determine the optimize database for real world applications. |
| | CO6 | Design a database system for a real world application. |
| | | **150403:Operating System** |
| | CO1 | Outline the basic concept of operating systems |
| | CO2 | Analyze the working of operating system |
| | CO3 | Examine the working of various scheduling/allocation approaches |
| | CO4 | Measure the performance of various scheduling/allocation approaches |
| | CO5 | Compare the various operating system problems/issues |
| | CO6 | Develop the Solution of various operating system problems/issues |
| | | **150404:Computer System Organization** |
| | CO1 | Demonstrate the computer architecture for defining basic component and functional unit. |
| | CO2 | Recall different number system and solve the basic arithmetic operations of signed and unsigned numbers. |
| | CO3 | Develop the fundamental concept to understand the working of microprocessor. |
| | CO4 | Explain the basic concept of input output organization. |
| | CO5 | Compare various memory and mapping techniques. |
| | CO6 | Develop the skill of writing assembly language programming. |
| | | **150405:Programming Lab** |
| | CO1 | Demonstrate the fundamentals of computer programming |
| | CO2 | Read, understand and trace the execution of program |
| | CO3 | Develop Conditional and Iterative Statements |
| | CO4 | Design the program using functions |
| | CO5 | Implement the programs using Derived and User defined data types |
| | CO6 | Design program for a given problem using computer programming |
| | | **100005:Ethics, Economics Entrepreneurship & Management** |
| | CO1 | List and describe various energy resources, their conversion to electrical power and role in technological & economic |
| | CO2 | Update themselves with national/international power status and renewable power development targets & missions |
| | CO3 | Understand the impact of pollution on the ecosystem and control policies adopted atnational/international levels |
| | CO4 | Illustrate the concepts of ecosystems and their conservation |
| | CO5 | Solve practical problems of society in a sustainable and ethical manner |
| | CO6 | Fulfill their professional duties keeping in mind the environmental safety, health, and welfare of public. |
| | | **150501:Discrete Structures** |
| | CO1 | understand the basic concepts of set theory, propositional logic, graph theory, discrete numeric function and algebraic structure. |
| | CO2 | Illustrate the knowledge of course content and distinguish between them in terms of their applications. |
| | CO3 | Implement the course content to solve the problems. |
| | CO4 | Apply the concept of studied topics with suitable technique faced in engineering problems. |
| | CO5 | Analyze the basic concepts of set theory, propositional logic, graph theory, discrete numeric function and algebraic structure to |
| | CO6 | Design the analytical skill and interpret applications of engineering beneficial in real time troubleshooting. |
| | | **150502:Software Engineering** |
| | CO1 | List various software models with respect to their accuracy and needs of the customer requirement. |
| | CO2 | Explain the real world problems using software engineering concepts. |
| | CO3 | Develop the technique and results with customer expectations. |
| | CO4 | Identify and how to use various cost estimation techniques used in software engineering. |
| | CO5 | Compare design of a system, component, or process to meet desired needs within realistic constraints |
| | CO6 | Develop the techniques, skills and software engineering tools necessary for engineering domain. |
| | | **150503:Theory of Computation** |
| er-5 | CO1 | Explain the basic concepts of switching and finite automata theory and languages. |
| | CO2 | Relate practical problems to languages, automata, computability, and complexity. |

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| Semest | CO3 | Construct abstract models of computing and analyse their power to recognize the languages. |
| | CO4 | Construct and analyze the grammar. |
| | CO5 | Apply mathematical models and descriptors in various computing theories |
| | CO6 | Solve problems in computer science using mathematical and formal techniques. |
| | | **150504:Microprocessor & Interfacing** |
| | CO1 | Classify the concepts of different advanced microprocessors and microcontroller. |
| | CO2 | Illustrate the various peripheral interfaces, controllers and bus standards. |
| | CO3 | Build a system using peripheral devices and controllers for 8086 microprocessor. |
| | CO4 | Distinguish the interface with various devices to the microprocessor. |
| | CO5 | Design an interface for various devices on 8086/8051 based systems. |
| | CO6 | Develops skills in assembly language programming for 8051 & 8086 applications. |
| | | **150505:Minor Project - I** |
| | CO1 | Able to formulate a real problem |
| | CO2 | Express the technical ideas, strategies and methodologies |
| | CO3 | Utilize the new tools, algorithms, techniques to obtain solution of the project |
| | CO4 | Test and validate the develop the prototype/results |
| | CO5 | Write a project report |
| | CO6 | Present the oral demonstration |
| | | **150506:Summer Internship Project - II** |
| | CO1 | Design solutions to real world problems |
| | CO2 | Express the technical ideas, strategies and methodologies |
| | CO3 | Utilize new tools, algorithms, techniques to obtain solution of the project |
| | CO4 | Evaluate the performance of the prototype/ results |
| | CO5 | Able to locate and use technical information from multiple sources. |
| | CO6 | Demonstrate the ability to communicate effectively in speech and writing |
| Semester 6 | | **100007:Disaster Management** |
| | CO1 | CO1: Identify disaster prevention and mitigation approaches |
| | CO2 | CO2: Classify global and national disasters, their trends and profiles |
| | CO3 | CO3: Determine the impacts of various disasters |
| | CO4 | CO4: Apply Disaster Risk Reduction in management |
| | CO5 | CO5: Infer the linkage between disasters, environment and development |
| | CO6 | |
| | | **150601: Compiler Design** |
| | CO1 | Recall 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 |
| | | **150602: Computer Networks** |
| | CO1 | Explain the fundamental concepts of Computer Networks. |
| | 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. |
| | | **150603:Minor Project - II** |
| | CO1 | Able to formulate a real problem |
| | CO2 | Express the technical ideas, strategies and methodologies |
| | CO3 | Utilize the new tools, algorithms, techniques to obtain solution of the project |
| | CO4 | Test and validate the develop the prototype/results |
| | CO5 | Write a project report |
| | CO6 | Present the oral demonstration |
| | | **(DE-1)150611:Network & Web Security** |
| | 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. |
| | | **(DE-1)150612: Image Processing** |
| | CO1 | Explain different modalities and current techniques in image acquisition. |
| | CO2 | Classify spatial and fequency domain techniques in image processing. |
| | CO3 | Apply image processing techniques to enhance visual images. |

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| | CO4 | Analyze 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 mathematical models and principle of digital image processing for real world problems |
| | | **(DE-1)150613:Mobile Computing** |
| | 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. |
| | | **(OC-1) 900106: Data Structures** |
| | 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 |
| | | **(OC-1) 900107:Python Programming** |
| | CO1 | explain the numbers, Math, functions, Strings, List, Tuples and Dictionaries in Python |
| | CO2 | apply different Decision-Making statements and Functions |
| | CO3 | identify the Object-oriented programming in Python |
| | CO4 | analyze the different File handling operations |
| | CO5 | design GUI Applications in Python and evaluate different database operations |
| | CO6 | develop Client-Server network applications using Python |
| Semester 7 | | **100008:Intellectual Property Rights** |
| | CO1 | Imbibe the knowledge of Intellectual Property and its protection through various laws |
| | CO2 | apply the knowledge of IPR for professional development |
| | CO3 | Identify the appopriate data structures to solve specific problems |
| | CO4 | develop a platform for protection and complianceof Intellectual Property Rights & knowledge |
| | CO5 | create awareness amidst academia and industry of IPR and Copyright compliance |
| | CO6 | deliver the purpose and function of IPR and patenting |
| | | **170703: Creative Problem Solving** |
| | CO1 | Define a Structured Problem Solving Process |
| | CO2 | Understand Cause-Effect- Symptom-Problem Relationships in Problem Definition |
| | CO3 | Apply Cause-Effect Tools and Techniques and Develop Root- Cause Analysis |
| | CO4 | Apply Idea Generation Tools and Techniques in Formulating Creative Solutions |
| | CO5 | Apply Evaluative Tools and Techniques for Decision Making Process |
| | CO6 | Identify Strategic Considerations in Evaluating Risks and Implementing Solutions |
| | | **(DE-3) 150711: Networking with TCP/IP** |
| | CO1 | define the concept of computer network and various layered architecture. |
| | CO2 | compare the classless and class full addressing of IPV4 . |
| | CO3 | identify the different types of networking devices and their functions within a network. |
| | CO4 | analyze various protocols of computer networks for assisting network design and implementation. |
| | CO5 | design client server applications and communication model and protocols for communication. |
| | CO6 | elaborate various TCP/IP protocol for achieving multimedia and security services. |
| | | **(DE-3) 150712: Data Mining & Warehousing** |
| | CO1 | Illustrate various tools of Data Mining and their techniques to solve the real time problems |
| | CO2 | Apply data preprocessing and data quality for construction of data warehouse |
| | CO3 | Identify various data bases and modeling of data warehouse and comparing various methods for storing & retrieving data from |
| | CO4 | Develop various classification algorithms for data using data mining. |
| | CO5 | Make use of data mining methods for identification of association for transactional databases. |
| | CO6 | Analyse data mining for knowledge discovery & prediction |
| | | **(DE-3) 150713: Distributed Systems** |
| | CO1 | tell the basic elements and concepts related to distributed system technologies |
| | CO2 | demonstrate knowledge of the core architectural aspects of distributed systems. |
| | CO3 | identify how the resources in a distributed system are managed by algorithm. |
| | CO4 | examine the concept of distributed file system and distributed shared memory. |
| | CO5 | compare various distributed system algorithms for solving real world problems. |
| | CO6 | develop application for achieving various services of distributed system |
| | | **(DE-4) 150754: Cloud Computing** |
| | CO1 | List various strengths and limitations of cloud computing. |
| | CO2 | Explain the architecture, infrastructure and delivery models of cloud computing |
| | CO3 | Apply suitable virtualization concepts. |
| | CO4 | Analyse various programming models and approaches for cloud computing. |

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| | CO5 | Elaborate various security mechanisms for cloud computing environment. |
| | CO6 | Predict various practical applications of cloud computing. |
| Semester-8 | | **(OC-2) 900209: Network Security** |
| | CO1 | define the concept of computer network and various layered architecture. |
| | CO2 | compare the classless and class full addressing of IPV4 . |
| | CO3 | identify the different types of networking devices and their functions within a network. |
| | CO4 | analyze various protocols of computer networks for assisting network design and implementation. |
| | CO5 | design client server applications and communication model and protocols for communication. |
| | CO6 | elaborate various TCP/IP protocol for achieving multimedia and security services. |
| | | **(OC-2) 900210: Data Mining & Warehousing** |
| | CO1 | Illustrate various tools of Data Mining and their techniques to solve the real time problems |
| | CO2 | Apply data preprocessing and data quality for construction of data warehouse |
| | CO3 | Identify various data bases and modeling of data warehouse and comparing various methods for storing & retrieving data from |
| | CO4 | Develop various classification algorithms for data using data mining. |
| | CO5 | Make use of data mining methods for identification of association for transactional databases. |
| | CO6 | Analyse data mining for knowledge discovery & prediction |
| | | **(OC-3) 900221 Artificial Intelligence** |
| | CO1 | Tell the fundamental concepts of Artificial Intelligence and its real-world applications. |
| | CO2 | Illustrate the various seraching algorithms used to solve AI problems. |
| | CO3 | Utilize the several techniques of Knowledge Representation to deal with AI problems. |
| | CO4 | Analyze the performance of various algorithm used in AI. |
| | CO5 | Evaluate programming methods and algorithmic principles in puzzle solving techniques. |
| | CO6 | Formulate an strategy to solve the real-world problems by various applications of AI. |
| | | **(OC-3) 900222 Computer Networks** |
| | 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. |
| | | **130801: Internship / Project** |
| | CO1 | Design solutions to real world problems |
| | CO2 | Express the technical ideas, strategies and methodologies |
| | CO3 | Utilize new tools, algorithms, techniques to obtain solution of the project |
| | CO4 | Evaluate the performance of the prototype/ results |
| | CO5 | Able to locate and use technical information from multiple sources. |
| | CO6 | Demonstrate the ability to communicate effectively in speech and writing |
| | | **(OC-2) 900619: Introduction to Internet of Things** |
| | CO1 | Explain internet of things, evolution of IoT, applications of IoT |
| | CO2 | classify IoT architecture, IoT service life cycle and application of device/cloud collaboration |
| | CO3 | Apply the concept of IoT in real world scenario |
| | CO4 | Analyse security and privacy in the IoT |
| | CO5 | choose appropriate framework for distributed data analysis for IoT and anomaly detection |
| | CO6 | develop small low cost embedded systems |