Madhav Institute of Technology and Science, Gwalior

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

Department of Information Technology

CO Attainment of B. Tech. Information Technology

Session: 2021-2022

	Course Name		Course outcomes	Direct Attainment %	Level of Direct Attainment	Indirect Attainment %	Level of Indirect Attainment	Overall level of Attainment	Target	Target of level	Gap	Attained/ Not Attained	Action Taken
Semester I	100015: Energy Environment, Ecology & Society	CO1	describe various energy resources, their conversion to electrical power and role in technological & economic development.	80.0	3.0	81.2	3.0	3.00	70	3.0	0	Attained	
		CO2	update with national/international power status and renewable power development targets & missions.	76.8	3.0	81.2	3.0	3.00	70	3.0	0	Attained	Students are encouraged to observe, to gain insight into possible approaches/solutions/algorithms to real life problems.
		CO3	recognize the impact of pollution on the ecosystem and control policies adopted at national/international levels.	76.8	3.0	84.1	3.0	3.00	70	3.0	0	Attained	
		CO4	illustrate the concepts of ecosystems and their conservation.	77.6	3.0	85.5	3.0	3.00	70	3.0	0	Attained	Students are motivated to develop mini-projects focusing on real world problems.
		CO5	solve practical problems of society in a sustainable and ethical manner.	75.2	3.0	78.3	3.0	3.00	70	3.0	0	Attained	Level of target should be improved.
		CO6	fulfill professional duties keeping in mind the environmental safety, health, and welfare of public.	76.8	3.0	85.5	3.0	3.00	70	3.0	0	Attained	
	230102:Introduction to Computer Programming	CO1	Identify situations where computational methods and computers would be useful.	75	3.0	81	3.0	3	65	2.5	0	Attained	
		CO2	Describe the basic principles of imperative and structural programming.	76	3.0	79.71	3.0	3	65	2.5	0	Attained	
		CO3	Develop a pseudo-code and flowchart for a given problem.	62	3.0	80	3.0	3	65	2.5	0	Attained	Additional topic specific tests should be conducted
		CO4	Analyze the problems and choose suitable programming techniques to develop solutions.	72	3.0	78	3.0	3	65	2.5	0	Attained	
		CO5	Design, implement, debug and test programs.	69.6	3.0	79.71	3.0	3	65	2.5	0	Attained	
		CO6	Design computer programs to solve real world problems.	76.8	3.0	79.71	3.0	3	65	2.5	0	Attained	
Semester II	160211: Data Structure	CO1	outline the basics of Algorithms and their performance criteria's.	68	2.8	88.4	3	2.84	60	2	-0.84	Attained	Students are encouraged to observe, to gain insight into possible approaches/solutions/algorithms to real life problems.
		CO2	explain the working of linear/Non Linear data structures.	61.6	2.2	91.3	3	2.33	60	2	-0.33	Attained	
		CO3	identify the appropriate data structure to solve specific problems.	62.4	2.2	89.9	3	2.39	60	2	-0.39	Attained	
		CO4	analyze the performance of various Data Structures & their applications.	60	2.0	89.9	3	2.2	60	2	-0.2	Attained	Research oriented mini skill projects are encouraged to develop and hone their research skills.
		CO5	evaluate the time/space complexities of various data structures & their applications	57.6	1.8	88.4	3	2.01	60	2	-0.01	Attained	
		CO6	design the optimal algorithmic solutions for various problems.	55.2	1.5	91.3	3	1.82	60	2	0.18	Not Attained	more practical approach and problems will be introduced with students.
	160311: Digital Electronics	CO1	explain the basic components and functional units to define computer architecture	68	2.8	76.8	3.0	2.84	65	2.5	-0.34	Attained	Additional topic specific tests should be conducted
		CO2	explain the basic components and functional units to define computer architecture	61.6	2.2	62.3	2.2	2.17	65	2.5	0.33	Not Attained	Extra classes to be conducted for slow learners beyond the regular planned classes.
		CO3	develop the understanding of combinational circuits	69	2.9	73.9	3.0	2.92	65	2.5	-0.42	Attained	Students are motivated to develop mini-projects focusing on real world problems.
		CO4	analyse the basic concept of sequential circuits	76	3.0	71.0	3.0	3.00	65	2.5	-0.50	Attained	Design of more converter should be initiated to make the work of students as par with industrial standards.
		CO5	analyse the basic concept of sequential circuits	55.2	1.5	63.8	2.4	1.69	65	2.5	0.81	Not Attained	More practical approach and problems will be introduced with students using K-map simpilfication technique.
		CO6	reduce the Boolean functions to mitigate hardware complexity issues	70	3.0	75.4	3.0	3.00	65	2.5	-0.50	Attained	Level of target shoul be increased
	160212:OOPs	CO1	Tell the concepts of classses & objects and their significance in real world	61.5	2.2	79.2	3	2.32	65	2.5	0.18	Not Attained	Arrangement of Remedial Classes
		CO2	Explain the benefits of object oriented design	59	1.9	57.6	1.8	1.87	65	2.5	0.63	Not Attained	Discussed extra Tutorial- sheets
		CO3	Build C++ classes using appropriate encapsulation and design principles	69.2	2.9	43.2	0	2.33	65	2.5	0.16	Not Attained	Arrangement of Remedial Classes
		CO4	Analyze the utilization of inheritance and polymorphism in the solutions of problems	64.1	2.4	79.2	3	2.52	65	2.5	0	Attained	More HOT questions should be added

		CO5	Choose appropriate lbject oriented programming concepts for solving real world problems	76.9	**3.0**	60	**2**	**2.8**	65	2.5	0	Attained	Level of questions should be improved.
		CO6	Develop solutions to problems demonstrating usage of control structures , modularity , I/O and other standard language constructs	66.6	**2.7**	57.6	**1.8**	**2.48**	65	2.5	0.02	Attained	Students are encouraged to participate in various coding competitions which involves the design and development of OOPS based software.
Semester III	**160311:Computer System Organization**	**CO1**	recall the basic building blocks of computer Architecture	60.8	**3.0**	77.33	**3.0**	**3.00**	60.00	2.00	0	Attained	Discuss extra Tutorial- sheets
		CO2	compare different memories	64.8	**3.0**	76.00	**3.0**	**3.00**	60.00	2.00	0	Attained	
		CO3	apply the concept of memory mapping, multiprocessor and pipelining in solving real world problems	61.2	**3.0**	76.00	**3.0**	**3.00**	60.00	2.00	0	Attained	
		CO4	analyze various modes of Input-Output data transfer	60.80	**3.0**	72.00	**3.0**	**3.00**	60.00	2.00	0	Attained	
		CO5	evaluate the arithmetic related to the number system	73.60	**3.0**	73.33	**3.0**	**3.00**	60.00	2.00	0	Attained	
		CO6	develop the skill of writing low level programming.	61.20	**3.0**	74.66	**3.0**	**3.00**	60.00	2.00	0	Attained	
	160312:Design & Analysis of Algorithms	**CO1**	Demonstrate a familiarity with major algorithms and data structures.	93.60	**3.00**	80.62	**3.00**	**3.00**	60.00	2.00	0	Attained	Level of target should be improved.
		CO2	Important algorithmic design paradigms and methods of analysis.	97.60	**3.00**	82.17	**3.00**	**3.00**	60.00	2.00	0	Attained	
		CO3	Analyze the asymptotic performance of algorithms.	73.60	**3.00**	77.52	**3.00**	**3.00**	60.00	2.00	0	Attained	
		CO4	Compare different design techniques to develop algorithms for computational problems.	62.40	**3.00**	79.07	**3.00**	**2.50**	60.00	2.00	0	Attained	
		CO5	Design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch n bound approach.	79.20	**3.00**	76.74	**3.00**	**3.00**	60.00	2.00	0	Attained	
		CO6	Understand the hardness and different classes of hardness. Further, design approximate solutions for computationally hard problems.	92.80	**3.00**	75.19	**3.00**	**3.00**	60.00	2.00	0	Attained	
	160313:Database Management System	**CO1**	demonstrate the concepts of different type of database system.	95.00	**3.0**	99.00	**3.0**	**3.0**	65	2.5	0	Attained	More practical based problems should be included in the curriculum
		CO2	apply relational algebra concepts to design database system.	98.00	**3.0**	88.00	**3.0**	**3.0**	65	2.5	0	Attained	
		CO3	make use of queries to design and access database system.	94.00	**3.0**	96.00	**3.0**	**3.0**	65	2.5	0	Attained	
		CO4	analyze the evaluation of transaction processing and concurrency control.	98.00	**3.0**	91.00	**3.0**	**3.0**	65	2.5	0	Attained	
		CO5	determine the optimize database for real world applications.	93.00	**3.0**	93.00	**3.0**	**3.0**	65	2.5	0	Attained	
		CO6	design a database system for a real world application.	98.00	**3.0**	100.00	**3.0**	**3.0**	65	2.5	0	Attained	
	160314:Operating System	**CO1**	tell the basic concept of operating systems.	72.80	**3.0**	81.00	**3.0**	**3.0**	60	2.0	0	Attained	Higher order thinking question should be included. Also encourage to find some research problem related to technological and economic development.
		CO2	explain the working procedure of the operating system.	63.20	**3.0**	75.00	**3.0**	**3.0**	60	2.0	0	Attained	
		CO3	analyze the various operating system problems and issues.	68.00	**3.0**	83.00	**3.0**	**3.0**	60	2.0	0	Attained	
		CO4	develop the solutions for various operating system problems and issues.	70.40	**3.0**	77.00	**3.0**	**3.0**	60	2.0	0	Attained	
		CO5	measure the performance of various scheduling and allocation techniques.	70.40	**3.0**	73.00	**3.0**	**3.0**	60	2.0	0	Attained	
		CO6	test the working of various scheduling and allocation techniques.	65.60	**3.0**	75.00	**3.0**	**3.0**	60	2.0	0	Attained	
Semester IV	**160411: Computer graphics**	**CO1**	Understand the basic concepts of computer graphics.	96.00	**3.0**	93.00	**3.00**	**3.00**	60	3.00	0	Attained	Level of questions should be improved.
		CO2	Demonstrate scan conversion problems using programming language.	95.00	**3.0**	93.00	**3.00**	**3.00**	60	3.00	0	Attained	More projects on solving complex problems will be included.
		CO3	Implement the concepts of geometric transformation of 2D and 3D objects.	88.00	**3.0**	87.00	**3.00**	**3.00**	60	3.00	0	Attained	Mini projects given to students are quite complex to help them in understanding complex problems.
		CO4	Apply clipping and filling techniques for modifying an object.	80.00	**3.0**	87.00	**3.00**	**3.00**	60	3.00	0	Attained	More HOT questions should be added
		CO5	Understand the practical implementation of modelling and rendering.	96.00	**3.0**	93.00	**3.00**	**3.00**	60	3.00	0	Attained	Discussed extra Tutorial- sheets
		CO6	Demonstrate the concept of viewing of 2D objects.	92.00	**3.0**	87.00	**3.00**	**3.00**	60	3.00	0	Attained	Level of questions should be improved.
	160412: Software Engineering	**CO1**	explain the various fundamental concepts of software engineering.	92.60	**3.0**	74.67	**3.0**	**3.0**	65	2.5	0	Attained	Level of target should be improved.
		CO2	develop the concepts related to software design & analysis.	81.60	**3.0**	69.33	**2.9**	**3.0**	65	2.5	0	Attained	More practical approach and problems would be introduced with students.
		CO3	compare the techniques for software project management & cost estimation.	91.20	**3.0**	69.33	**2.9**	**3.0**	65	2.5	0	Attained	More projects on software development would be included.
		CO4	choose the appropriate model for real life software project.	96.80	**3.0**	77.33	**3.0**	**3.0**	65	2.5	0	Attained	Real life Projects can be assigned to improve the software development.
		CO5	design the software using modern tools and technologies.	99.20	**3.0**	68.00	**2.8**	**3.0**	65	2.5	0	Attained	Level of target should be improved.
		CO6	test the software through different approaches.	57.60	**1.8**	74.60	**3.0**	**2.0**	65	2.5	0.54	Not Attained	Additional guest lectures and workshops are conducted to educate students on modern IT tools.

Semeste	160413: Computer Networks	CO1	explain the fundamental concepts of computer network.	85.00	3.0	87.30	3.0	3.0	60	3.0	-16.8	Attained	an initial exposure to hardware implementation and experimentation, thereby enabling better productivity during final year project
		CO2	illustrate the basic taxonomy & terminologies of computer network.	75.00	3.0	79.30	3.0	3.0	60	3.0	-17.4	Attained	
		CO3	to identify various parameter for affecting the performance of computer network.	83.00	3.0	80.90	3.0	3.0	60	3.0	-29.6	Attained	
		CO4	analyze the concepts of communication using various layer of OSI model.	74.00	3.0	85.70	3.0	3.0	60	3.0	-12.8	Attained	
		CO5	to evaluate the performance of computer network in congestion and Internet.	85.00	3.0	84.12	3.0	3.0	60	3.0	-15.2	Attained	
		CO6	to design the network environment and applications for implementation of computer networking concept.	78.00	3.0	84.12	3.0	3.0	60	3.0	-5.6	Attained	
	100004: Cyber Security	CO1	Tell the basic terminologies of cyber Security	70.83	3.0	79.2	3	2.9	65	2.5	0	Attained	More HOT questions should be added
		CO2	Explain the basic concept of networking and Internet.	64.6	2.5	84.8	3	2.6	65	2.5	0	Attained	More HOT questions should be added
		CO3	Apply various methods used to protect data in the internet environment in real world situations.	62.5	2.3	88	3	2.4	65	2.5	0.1	Not Attained	Arrangement of Remedial Classes
		CO4	Discover the concept of IP security and architecture.	68	2.8	66.4	2.6	2.8	65	2.5	0	Attained	More HOT questions should be added
		CO5	Compare various types of cyber security threats/vulnerabilities.	60.4	2.0	81.6	3	2.2	65	2.5	0.27	Not Attained	Discuss extra Tutorial- sheets
		CO6	Develop the understanding of cyber crime investigation and IT ACT 2000.	66.6	2.7	60	2	2.5	65	2.5	0	Attained	More HOT questions should be added
Semester V	160501:Discrete Structure	CO1	Understand the basic concept of set theory, prepositional logic, graph theory, discrete numeric function and algebraic structure	72.464	3.0	83.2	3	3	65	2.5	0	Attained	Level of questions in examination will improve and also discuss based research problems with students.
		CO2	Illustrate the knowledge of course content and distinguish between them in terms of their applications	69.565	2.9	61	2.1	2.7	65	2.5	0	Attained	
		CO3	Implement the course content to solve the problems.	69.565	3.0	88.8	3	3	65	2.5	0	Attained	
		CO4	Apply the concepts of studied topics with suitable technique faced in engineering problems.	65.217	2.5	81	3	2.8	65	2.5	0	Attained	More assignments and tutorials are to be given to students for better understanding.
		CO5	Analyze the set theory, prepositional logic, graph theory, discrete numeric function and algebraic structure to examine the real world problem	72.464	3.0	90.4	3	3	65	2.5	0	Attained	
		CO6	Design analytical skill and interpret applications of engineering beneficial in real time troubleshooting	73.913	3.0	88	3	3	65	2.5	0	Attained	
	160502:Software Engineering	CO1	explain the various fundamental concepts of software engineering.	92	3.0	74.66	3	3	65	2.5	0	Attained	Higher order thinking question should be included. Also encourage to find some research problem related to technological and economic development.
		CO2	develop the concepts related to software design & analysis.	81.6	3.0	69.33	3	3	65	2.5	0	Attained	
		CO3	compare the techniques for software project management & cost estimation.	91.2	3.0	69.33	3	3	65	2.5	0	Attained	
		CO4	choose the appropriate model for real life software project.	96.8	3.0	77.33	3	3	65	2.5	0	Attained	
		CO5	design the software using modern tools and technologies.	99.2	3.0	68	3	3	65	2.5	0	Attained	
		CO6	test the software through different approaches.	57.6	3.0	74.66	3	2.6	65	2.5	0	Attained	
	160503:Theory of Computation	CO1	explain the basic concepts of switching and finite automata theory & languages.	72.8	3.0	77	3	3	60	2.5	0	Attained	Project based learning should be included in the subject
		CO2	relate practical problems to languages, automata, computability and complexity	77.6	3.0	73	3	3	60	3	0	Attained	
		CO3	construct abstract models of computing and check their power to recognize the languages.	77.6	3.0	79	3	3	60	3	0	Attained	
		CO4	lanalyse the grammar, its types, simplification and normal form.	55.2	3.0	77	3	3	60	3	0	Attained	
		CO5	interpret rigorously formal mathematical methods to prove properties of languages, grammars and automata.	75.2	3.0	75	3	3	60	3	0	Attained	
		CO6	develop an overview of how automata theory, languages and computation are applicable in engineering application.	65.6	3.0	73	3	3	60	3	0	Attained	
	160504:Microprocessor & Interfacing	CO1	Classify the concepts of different advanced microprocessors and microcontroller.	85	3.0	75	3	3	65	2.5	0	Attained	More HOT questions should be added
		CO2	Illustrate the various peripheral interfaces, controllers and bus standards.	84	3.0	75	3	2.9	65	2.5	0	Attained	
		CO3	Build a system using peripheral devices and controllers for 8086 microprocessor.	96	3.0	70	3	2.9	65	2.5	0	Attained	
		CO4	Distinguish the interface with various devices to the microprocessor.	88	3.0	72	3	3	65	2.5	0	Attained	
		CO5	Design an interface for various devices on 8086/8051 based systems.	93	3.0	75	3	2.8	65	2.5	0	Attained	
		CO6	Develops skills in assembly language programming for 8051 & 8086 applications.	92	3.0	70	3	3	65	2.5	0	Attained	

Semester VI	160716: Mobile Computing	CO1	explain the basic concepts of mobile telecommunications system	96.8	2.5	75	2.5	2.5	60	2.5	0	Attained	More tough quiz and assignment should be given to access the student
		CO2	demonstrate the infrastructure to develop mobile communications system	78.4	2.5	79	2.5	2.5	60	2.5	0	Attained	
		CO3	classify the different generations and technology for mobile communications	99.2	2.5	66	2.5	2.5	60	2.5	0	Attained	
		CO4	examine the working of different protocols of wireless mobile communication technology.	74.4	2.5	70	2.5	2.5	60	2.5	0	Attained	
		CO5	determine the importance of each technology suitable for different situation of mobile and wireless communications	67	2.5	75	2.5	2.5	60	2.5	0	Attained	
		CO6	develop protocols for adhoc and infrastructure based wireless networks.	86	2.5	79	2.5	2.5	60	2.5	0	Attained	
	900208: Soft Computing	CO1	define basic concepts of neural network and fuzzy systems	89.6	3.0	72	3	3	60	2.5	0	Attained	Students are motivated to develop mini-projects focusing on real world problems.
		CO2	compare solutions by applying various soft computing approaches on a given problem.	83.04	3.0	65.33	3	3	60	2.5	0	Attained	Lab experiment list of the subject should be revised
		CO3	develop and train different supervised and unsupervised learning	91.2	3.0	65.33	3	3	60	2.5	0	Attained	More tough quiz and assignment should be given to access the student
		CO4	classify various nature inspired algorithms according to their application aspect.	93.5	3.0	76	3	3	60	2.5	0	Attained	Target level should be improved
		CO5	compare the efficiency of various hybrid systems.	94.5	3.0	61.33	3	3	60	2.5	0	Attained	More HOT questions should be added
		CO6	design a soft computing model for solving real world problems	59.7	3.0	70.66	3	2	60	2.5	0	Attained	Discussed extra Tutorial- sheets
	900209: Network Security	CO1	define various aspects of network security	84.8	3.0	73	3	3	60	2.5	0	Attained	Mini projects given to students are quite complex to help them in understanding complex problems.
		CO2	illustrate fundamentals of number theory and cryptography	80	3.0	74	3	3	60	2.5	0	Attained	
		CO3	apply security mechanisms to achieve principles of network security	82.4	3.0	73	3	3	60	2.5	0	Attained	
		CO4	analyze the cause for various existing network attacks	89.6	3.0	73	3	3	60	2.5	0	Attained	
		CO5	examine the vulnerabilities in applications over internet.	86.4	3.0	72	3	3	60	2.5	0	Attained	
		CO6	develop a secure protocol for achieving various network security services.	72.8	3.0	73	3	3	60	2.5	0	Attained	
	900220: R Programming	CO1	define basic programming constructs used in R.	80.8	3.0	75	3	3	60	2	0	Attained	Survey oriented case studies should be provided to students to identify the impact of pollution on ecosystem.
		CO2	explain the various commands used in R.	80.8	3.0	83.33	3	3	60	2	0	Attained	
		CO3	apply various concept of programming for controlling the flow of data using R.	70.4	3.0	77.78	3	3	60	2	0	Attained	
		CO4	analyze the concept of concept of object oriented programming in R.	68	3.0	77.78	3	3	60	2	0	Attained	
		CO5	choose appropriate packages of R programming for dealing various tasks.	94.4	3.0	77.78	3	3	60	2	0	Attained	
		CO6	predict results from the datasets using R commands.	78.4	3.0	77.78	3	3	60	2	0	Attained	
	900222: Computer Networks	CO1	lexplain the fundamental concepts of computer network.	96	3.0	76	3	3	65	2.5	0	Attained	Beyond the syllabus, some practical problem of AI will provide to students during class session and discuss important facts related to problem.
		CO2	illustrate the basic taxonomy & terminologies of computer network.	95.2	3.0	74.667	3	3	65	2.5	0	Attained	
		CO3	lidentify various parameter for affecting the performance of computer network.	95.2	3.0	76	3	3	65	2.5	0	Attained	
		CO4	analyze the concepts of communication using various layer of OSI model.	91.2	3.0	73.333	3	3	65	2.5	0	Attained	
		CO5	evaluate the performance of computer network in congestion and Internet.	92.8	3.0	74.667	3	3	65	2.5	0	Attained	
		CO6	design the network environment and applications for implementation of computer networking concept.	95.2	3.0	74.667	3	3	65	2.5	0	Attained	
Semester VII	160601:Compiler Design	CO1	define the concepts of finite automata and context free grammar.	77.6	3.0	88	3	3.0	60	3	0	Attained	Students should be made to solve more complex problems of compiler
		CO2	build the concept of working of compiler.	77.6	3.0	82.67	3	3.0	60	3	0	Attained	More practical based topics should be included in the curriculum
		CO3	examine various parsing techniques and their comparison.	80	3.0	85.33	3	3.0	60	3	0	Attained	Target level should be improved
		CO4	compare various code generation and code optimization techniques	76.8	3.0	86.67	3	3.0	60	3	0	Attained	Target level should be improved
		CO5	analyze different tools and techniques for designing a compiler.	72.8	3.0	85.33	3	3.0	60	3	0	Attained	Lab experiment list of the subject should be revised
		CO6	design various phases of compiler.	84.8	3.0	86.67	3	3.0	60	3	0	Attained	Project based learning should be included in the subject
	160602: Computer Networks	CO1	Explain the fundamental concepts of computer network.	76	3.0	88	3	3.0	60	3	0	Attained	More tough quiz and assignment should be given to access the student
		CO2	Illustrate the basic taxonomy & terminologies of computer network protocols.	80.8	3.0	82.67	3	3.0	60	3	0	Attained	More practical based problems should be included in the curriculum
		CO3	Develop a concept for understanding advance computer network.	89.6	3.0	85.33	3	3.0	60	3	0	Attained	Project based learning should be included in the subject
		CO4	Build the skill of IP addressing and routing mechanism.	91.2	3.0	86.67	3	3.0	60	3	0	Attained	Target level should be improved
		CO5	160602: Predict the performance of computer network in congestion and internet.	72.8	3.0	85.33	3	3.0	60	3	0	Attained	More HOT questions should be added
		CO6	Construct the network environment for implementation of computer networking concepts.	82.4	3.0	86.67	3	3.0	60	3	0	Attained	Target level should be improved