Programme Educational Objectives, Programme Outcomes, Programme Specific Outcomes

and

Learning Outcomes

of

Artificial Intelligence & Data Science

offered by

Centre for Artificial Intelligence

Madhav Institute of Technology & Science

Gwalior, Madhya Pradesh-474005

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1. Programme Educational Objectives

PEO 1: Graduates will excel in leveraging artificial intelligence and data science techniques to extract valuable insights from complex large datasets. They will apply advanced analytics and machine learning techniques to support data-driven decision-making across diverse domains.

PEO 2: Graduates will design and implement scalable data solutions, focusing on ethical considerations such as privacy and fairness and ensuring the ethical use of data in the development of AI-driven applications.

PEO 3: Graduates will nurture a commitment to lifelong learning with a focus on leadership and entrepreneurship in AI and Data Science.

2. Programme Outcomes & Programme Specific Outcomes

Programme Outcomes

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and Leader in a team, to manage projects and in multidisciplinary environments.

P1O12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes

At the end of the program, the student should be able to:

PSO1: Exhibit comprehensive understanding of human cognition, artificial intelligence, and data science principles to address real-world challenges and successfully confront the evolving demands of society.

PSO2: Apply probability, statistics, and computing concepts to solve complex real-world problems, demonstrating the adeptness to meet the dynamic challenges.

3.Learning Outcomes of all courses/subjects-

First Year:

Subject Code	Title of Subject	Semester	Subject Category
270101	**Introduction to AI & DS**	**I**	**DC**

Learning outcomes:

After the completion of the course, students will be able to:

1. define basic concepts of Artificial Intelligence.

2. relate various computer components used in Artificial Intelligence.

3. identify different logical and reasoning techniques used in AI.

4. understand pattern discovery, data handling and visualization.

5. analyse the general modelling process in data science.

6. understand real world problems and applications of AI and DS for solving the problems.

First Year:

Subject Code	Title of Subject	Semester	Subject Category

Subject Code	Title of Subject	Semester	Subject Category
270102	**Introduction to Computer Programming**	**I**	**DC**

Learning outcomes:

After the completion of the course, students will be able to:

1. identify situations where computational methods and computers would be useful.

2. describe the basic principles of imperative and structural programming.

3. develop a pseudo-code and flowchart for a given problem.

4. analyze the problems and choose suitable programming techniques to develop solutions.

5. design, implement, debug and test programs.

6. design computer programs to solve real world problems.

First Year:

Subject Code	Title of Subject	Semester	Subject Category
100022	**Basic Electrical & Electronics Engineering**	**I**	**ESC**

Learning outcomes:

After the completion of the course, students will be able to:

1. solve DC & AC circuits by applying fundamental laws & theorems.

2. analyze the response of linear electrical and magnetic circuits for given input.

3. explain the working principle, construction, applications of single phase transformer & rotating electrical machines.

4. determine the performance parameters such as efficiency, voltage regulation by using equivalent circuit of single phase transformer.

5. select the logic gates for various applications in digital electronics circuits.

6. analyze the characteristics of Diode and Transistor.

First Year:

Subject Code	Title of Subject	Semester	Subject Category
250100	**Linear Algebra**	**I**	**ESC**

Learning outcomes:

After the completion of the course, students will be able to:

1. determine the solution of Matrix.

2. find the analytical solution of algebraic structures.

3. express the vector space.

4. acquire the knowledge of Linear transformation.

5. illustrate the concept of Inner product spaces.

First Year:

Subject Code	Title of Subject	Semester	Subject Category
100015	**Energy, Environment, Ecology & Society**	**I**	**HSMC**

Learning outcomes:

After the completion of the course, students will be able to:

1. describe various energy resources, their conversion to electrical power and role in technological & economic development.

2. update with national/international power status and renewable power development targets & missions.

3. recognize the impact of pollution on the ecosystem and control policies adopted at national/international levels.

4. illustrate the concepts of ecosystems and their conservation.

5. solve practical problems of society in a sustainable and ethical manner.

6. fulfill professional duties keeping in mind the environmental safety, health, and welfare of public.

First Year:

Subject Code	Title of Subject	Semester	Subject Category
270201	**Digital Logic Design**	**II**	**DC**

Learning outcomes:

After the completion of the course, students will be able to:

1. explain the computer architecture for defining basic component and functional unit.

2. recall different number system and solve the basic arithmetic operations.

3. develop the understanding of combinational corcuits.

4. analyse the basic concepts of sequential circuits.

5. compare various memories.

6. solve the Boolean functions using logic gates.

First Year:

Subject Code	Title of Subject	Semester	Subject Category
250106	**Probability & Random Process**	II	BSC

Learning outcomes:

After the completion of the course, students will be able to:

1. interpret the theory of Probability and its distributions.

2. evaluate the Skewness, Kurtosis, curve fitting, correlation and regression.

3. apply the various test to validate the hypothesis

4. explain the knowledge of random variables.

5. Judge the various random processes.

First Year:

Subject Code	Title of Subject	Semester	Subject Category
270202	**Data Structures**	II	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. outline the basics of algorithms and their performance criteria's.

2. explain the working of Linear/non linear data structures.

3. identify the appropriate data structure to solve specific problems.

4. analyse the performance of various data structures and their applications.

5. evaluate the time/space complexities of various data structures and their applications.

6. design the optimal algorithmic solutions for various problems.

First Year:

Subject Code	Title of Subject	Semester	Subject Category
270203	**Object Oriented Programming & Methodology**	II	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. relate the concepts and significance of OOPs in real world.

2. demonstrate adeptness of object oriented programming to solve problems using Object oriented concepts.

3. apply object oriented programming to develop solutions of problems using standard language constructs.

4. analyze data flow diagrams and flow charts for small/ moderate problems.

5. determine how to simulate the problem in field of Operating system, Computer networks and real world problems.

6. develop software using concepts of objects, associations and integrity constraint.

First Year:

Subject Code	Title of Subject	Semester	Subject Category
100016	**Technical Language**	**II**	**HSMC**

Learning outcomes:

After the completion of the course, students will be able to:

1. speak clearly effectively and appropriately in a public forum to a variety of audiences and purposes. (LOT1)

2. prepare oral presentations and arguments within the Engineering Profession effectively. (LOT2)

3. demonstrate knowledge and comprehension of major text and traditions in language as well as its social, cultural, and historical context. (LOT3)

4. read a variety of Text analytically so as to demonstrate in writing and/or speech the interpretation of texts. (HOT4)

5. interpret text written in English assessing the results in written and oral arguments using appropriate material for support. (LOT3)

First Year:

Subject Code	Title of Subject	Semester	Subject Category
100017	**Language Lab**	**II**	**HSMC**

Learning outcomes:

After the completion of the course, students will be able to:

1. speak clearly effectively and appropriately in a public forum to a variety of audiences and purposes. (LOT1)

2. deliver effectively oral presentations. (LOT3)

3. grasp knowledge and comprehensive skills to speak on a given topic on spot. (LOT2)

4. interpret English spoken by others and respond to situation. (LOT3)

5. analyse English Language as spoken by others in day to day life. (HOT4)

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270301	**Discrete Structures**	**III**	BSC

Learning outcomes:

After the completion of the course, students will be able to:

1. define the basic concepts of set theory, propositional logic, graph theory, discrete numeric function and algebraic structure.

2. illustrate the knowledge of course content and distinguish between them in terms of their applications.

3. implement the course content to solve the problems.

4. apply the concept of studied topics with suitable technique faced in engineering problems.

5. analyze the basic concepts of set theory, propositional logic, graph theory, discrete numeric function and algebraic structure to examine the real world problems.

6. design the analytical skill and interpret applications of engineering beneficial in real time.troubleshooting.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270302	**Design & Analysis of Algorithms**	**III**	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. demonstrate a familiarity with major algorithms and data structures.

2. apply important algorithmic design paradigms and methods of analysis.

3. analyze the asymptotic performance of algorithms.

4. compare different design techniques to develop algorithms for computational problems.

5. design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch n bound approach.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270303	**Operating System**	**III**	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. define the basic concept of operating systems.

2. explain the working procedure of the operating system.

3. analyze the various operating system problems and issues.

4. develop the solutions for various operating system problems and issues.

5. measure the performance of various scheduling and allocation techniques.

6. test the working of various scheduling and allocation techniques.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270304	**Computer Network & Protocols**	III	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. explain the fundamental concepts of computer network.

2. illustrate the basic taxonomy & terminologies of computer network protocols.

3. develop a concept for understanding advance computer network.

4. build the skill of IP addressing and routing mechanism.

5. predict the performance of computer network in congestion and internet.

6. construct the network environment for implementation of computer networking concept.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270305	**Database Management System**	III	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. demonstrate the concepts of different type of database system.

2. apply relational algebra concepts to design database system.

3. make use of queries to design and access database system.

4. analyze the evaluation of transaction processing and concurrency control.

5. determine the optimize database for real world applications.

6. design a database system for a real world application.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270306	Python Programming Lab	III	DLC

Learning outcomes:

After the completion of the course, students will be able to:

1. define the various computational problems using python language.

2. explain the basic syntax and features of python.

3. apply appropriate online tools like colab for effective real-time problem solving.

4. evaluate the problems based on distinguished datasets.

5. design programs utilizing features of Object Oriented Programming in Python.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270307	Self - learning / Presentation	III	Seminar/self study

Learning outcomes:

After the completion of the course, students will be able to:

1. refer various technical resources available from multiple fields.

2. improve his/her performance in self- learning domain.

3. acquire additional knowledge of multi- disciplinary domains.

4. prepare oral demonstrations.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270308	Summer Internship Project-I	III	DLC

Learning outcomes:

After the completion of the course, students will be able to:

1. identify job skills, knowledge and attitude requisite to constitute a professional identity.

2. express the technical ideas, strategies and methodologies.

3. demonstrate professional ethics and awareness about general workplace behaviour.

4. adhere to deadlines and commitment to complete the assignment.

5. write professional work reports and presentations.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270401	**Computer Architecture & Microprocessor**	**IV**	**DC**

Learning outcomes:

After the completion of the course, students will be able to:

1. demonstrate the computer Architecture and microprocessor for defining basic component and functional unit.

2. develop the fundamental concept to understand the working of computer architecture and microprocessor.

3. explain the basic concept of input and output and memory organization.

4. develop the skill of writing assembly language programming.

5. build the system using peripheral devices and controllers for 8086 microprocessors.

6. apply the concept of computer architecture and microprocessor in solving real world problems.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270402	**Cloud Computing**	**IV**	**DC**

Learning outcomes:

After the completion of the course, students will be able to:

1. define various basic concepts related to cloud computing.

2. identify the architecture, infrastructure and delivery models of cloud computing.

3. apply suitable virtualization concepts.

4. choose the appropriate programming models and public cloud platforms.

5. analyse various security issues in cloud computing.

6. compose virtualization, security and programming modules in cloud computing solutions.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270403	**Software Engineering**	IV	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. explain the various fundamental concepts of software engineering.

2. develop the concepts related to software design & analysis.

3. compare the techniques for software project management & estimation.

4. choose the appropriate model for real life software project.

5. design the software using modern tools and technologies.

6. test the software through different approaches.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270404	**Machine Learning & Optimization**	IV	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. define a familiarity with major optimization algorithms.

2. apply important optimization algorithmic and analyze the results.

3. choose the local and global optimum for a given set of problem variables.

4. test for the design problems to be solved as mathematical programming problems.

5. design supervised and unsupervised learning approaches for real-life problems.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270405	**Network & Web Security**	IV	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. explain cryptographic algorithms, hash algorithms and authentication mechanisms.

2. illustrate fundamentals of number theory, attacks and security principles.

3. apply number theory and various algorithms to achieve principles of security.

4. analyze the cause for various existing network attacks and describe the working of available security controls.

5. examine the vulnerabilities in IT infrastructure.

6. predict the attacks and controls associated with IP, transport-level, web and e-mail security.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
270406	**Design & Thinking Lab**	**IV**	**DLC**

Learning outcomes:

After the completion of the course, students will be able to:

1. define the basic concept of embedded system.

2. describe the basic principles of Arduino Programming and IDE.

3. familiarize with different type of sensors and related systems.

4. design, implement, test and debug systems/programs.

5. design and develop smart systems applications.

6. interface different sensors to embedded boards like arduino.

Second Year:

Subject Code	Title of Subject	Semester	Subject Category
1000001	**Indian Constitution & Traditional Knowledge**	**IV**	**MAC**

Learning outcomes:

After the completion of the course, students will be able to:

1. know the rich Indian traditions and the Indian constitution.

2. appraise the utility and significance of tradition and its applicability in present times.

3. employ the knowledge of the constitutional norms as laid in the constitution and abide by the practices stated therein.

4. create a better society and living standards for themselves as well as for others.

5. recognize the basic concepts of ethics and morality pertaining to Indian culture and tradition.

6. connect traditional Indian philosophy with their everyday conduct and practices.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270501	**Information Retreival**	V	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. gain the basic concepts and techniques in Information retrieval.

2. explain the issue in represenation and graphical documents.

3. comprehand types of text analysis, IR system arhitecture, query processing models and probabilistics models.

4. process the text data for text classification.

5. apply the different evaluation strategies to the retrieved results for computing the efficiency and accuracy.

6. perform indexing, compression, information categorization and sentiments analysis.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270502	**Data Science using Python**	V	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. define the fundamental of data science and its importance.

2. contrast the basic of python and libraries related to data science.

3. classify different types of data analytics.

4. oraginize the data collected from different sources.

5. analyze the pre-processing and data reduction techniques.

6. create the graphical representation of data through visualization tools on various applications.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270503	**Theory of Computation**	V	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. explain the basic concepts of switching and finite automata theory and languages.

2. relate practical problems to languages, automata, computability, and complexity.

3. construct abstract models of computing and analyse their power to recognize the languages.

4. construct and analyze the grammar.

5. apply mathematical models and descriptors in various computing theories

6. solve problems in computer science using mathematical and formal techniques.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270504	**Computer Graphics & Multimedia**	**V**	**DC**

Learning outcomes:

After the completion of the course, students will be able to:

1. explore various display devices and application of computer graphics.

2. illustrate various scan conversion techniques.

3. apply 2D and 3D transformation and projection techniques.

4. classify the methods of image clipping and various algorithms for line and polygon clipping.

5. apply appropraite filling algortithm, hidden surface alogrithm on images.

6. summarize various color models, shading methods and color algorithms.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270505	**Soft Computing**	**V**	**DC**

Learning outcomes:

After the completion of the course, students will be able to:

1. define basic concepts of neural networks and fuzzy systems.

2. compare solutions by applying various soft computing approiaches on a given problem.

3. develop and train different supervised & unsupervised learning.

4. classify various nature inspired algorithms according to their applications aspect.

5. compare the efficiency of various hybrid systems.

6. design a soft computing model for solving real world problems.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270506	**Minor Project**	**V**	**DLC**

Learning outcomes:

After the completion of the course, students will be able to:

1. formulate the real world problems.
2. demonstrate critical thinking skills by evaluating different approaches, methodologiesor solutions.
3. utilize the new tools, algorithms, techniques to obtain solution of the project.
4. write technical report.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270507	**Self learning / presentation**	**V**	**Seminar/ self study**

Learning outcomes:

After the completion of the course, students will be able to:

1. refer various technical resources available from multiple fields.

2. improve his/her performance in self- learning domain.

3. acquire additional knowledge of multi- disciplinary domains.

4. prepare oral demonstrations.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270508	**Summer internship project- II**	**V**	**DLC**

Learning outcomes:

After the completion of the course, students will be able to:

1. identify job skills, knowledge and attitude requisite to constitute a professional identity.

2. express the technical ideas, strategies and methodologies.

3. demonstrate professional ethics and awareness about general workplace behaviour.

4. adhere to deadlines and commitment to complete the assignment.

5. write professional work reports and presentations**.**

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
1000006	**Disaster Management**	**V**	**MAC**

Learning outcomes:

After the completion of the course, students will be able to:

1. define the characteristics of various types of disasters.

2. classify the types of disasters.

3. choose the appropriate suggestive measures as per the nature and type of disaster.

4. analyze the possible causes and consequences of an earlier or ongoing disaster.

5. evaluate the performance of existing countermeasures used for disaster management.

6. design realistic solution-based strategies for dealing with natural disasters.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270601	**Data mining & Warehousing**	**VI**	**DC**

Learning outcomes:

After the completion of the course, students will be able to:

1. explain basics of data mining and data warehousing.

2. classify database systems and data models / schemas of data warehouses.

3. compare methods for storing & retrieving data from different data sources/repositories.

4. apply data mining techniques for knowledge extraction from large amount of data.

5. predict trends to make informed decisions.

6. develop real world applications using data mining techniques.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270602	**Image Processing**	VI	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. describe the fundamentals of image processing.

2. classify image enhancement techniques in both spatial and frequency domains for noise removal and better appearance.

3. apply image segmentation for object and boundary detection.

4. analyze the causes for image degradation and image restoration.

5. evaluate image compression techniques.

6. implement novel image filtering techniques.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270603	**Deep Learning**	VI	DC

Learning outcomes:

After the completion of the course, students will be able to:

1. recall the concepts of neural networks, activation functions and optimization algorithms.

2. explain the principles of back-propagation and gradient descent.

3. select an appropriate deep learning model for problem solving.

4. evaluate the performance of deep learning models.

5. compare the applicability of deep learning architectures across the problem domain.

6. develop novel deep learning architectures for specific applications.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
270604	**Minor Project II**	VI	DLC

Learning outcomes:

After the completion of the course, students will be able to:

1. formulate the real world problems.
2. demonstrate critical thinking skills by evaluating different approaches, methodologiesor solutions.
3. utilize the new tools, algorithms, techniques to obtain solution of the project.
4. write technical report.

Third Year:

Subject Code	Title of Subject	Semester	Subject Category
1000007	**Intellectual Property Rights**	**VI**	**MAC**

Learning outcomes:

After the completion of the course, students will be able to:

1. imbibe the knowledge of Intellectual Property and its protection through various laws.

2. apply the knowledge of IPR for professional development.

3. develop a platform for protection and compliance of Intellectual Property Rights & knowledge.

4. create awareness amidst academia and industry of IPR and Copyright compliance.

5. deliver the purpose and function of IPR and patenting.

4.Scheme of Examination

Scheme of Evaluation

(Artificial Intelligence and Data Science)

I Semester

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Department of Information Technology
Scheme of Evaluation
B. Tech. I Semester *(Artificial Intelligence (AI) and Data Science)*

(for batches admitted in academic session 2021-22 onwards)

S. No.	Subject Code	Category Code	Subject Name	Theory Slot End Term Evaluation – End Sem. Exam	Theory Slot – ⁵Proficiency in subject /course	Theory Slot Continuous Evaluation – Mid Sem. Exam.	Theory Slot Continuous Evaluation – Quiz/Assignment	End Sem. Exam	Practical Slot Continuous Evaluation – Lab Work & Sessional	Practical Slot Continuous Evaluation – Skill Based Mini Project	Total Marks	L	T	P	Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam.
1.	270101	DC	Introduction to Artificial Intelligence & Data Science	50	10	20	20	-	-	-	100	4	-	-	4	Blended (3/1)	MCQ
2.	270102	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	03	04	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.

⁵Proficiency in course/subject includes the weightage towards ability/ skill/ competency /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

Mode of Teaching – Theory – Offline	Mode of Teaching – Theory – Online	Mode of Teaching – Theory – Blended – Offline	Mode of Teaching – Theory – Blended – Online	Mode of Teaching – Lab – Offline	Mode of Examination – Theory – PP	Mode of Examination – Theory – A+O	Mode of Examination – Theory – MCQ	Mode of Examination – Lab – SO	
04	03	07	03	02	04	03	10	02	19
21.05%	15.79%	36.84%	15.79%	10.53%	21.05%	15.79%	52.63%	10.53%	Credits %

(ACADEMICS)
M.I.T.S
GWALIOR

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Department of Information Technology

Scheme of Evaluation

B. Tech. II Semester *(Artificial Intelligence (AI) and Data Science)*

(for batch 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	^{S}Proficiency in subject /course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	270201	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
2.	250106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP
3.	270202	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
4.	270203	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	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	60	60	800	14	02	06	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.

^{S}Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /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

Mode of Teaching					Mode of Examination				Total Credits
Theory				Lab	Theory			Lab	
Offline	Online	Blended		Offline	PP	A+O	MCQ	SO	
		Offline	Online						
04	-	08	04	03	13	03	-	03	19
21.05%		42.11%	21.05%	15.79%	68.42%	15.79%	-	15.79%	Credits %

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Department of Information Technology
Scheme of Evaluation
B. Tech. III Semester *(Artificial Intelligence (AI) and Data Science)*

(for batch admitted in academic session 2021-22)

S. No.	Subject Code	Category Code	Subject Name	Theory Slot End Term Evaluation End Sem. Exam	Theory Slot End Term Evaluation Proficiency in subject /course	Theory Slot Continuous Evaluation Mid Sem. Exam.	Theory Slot Continuous Evaluation Quiz/ Assignment	Practical Slot End Sem. Exam.	Practical Slot Continuous Evaluation Lab Work & Sessional	Practical Slot Continuous Evaluation Skill Based Mini Project	Total Marks	L	T	P	Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam.
1.	270301	BSC	Discrete Structure	50	10	20	20	-	-	-	100	2	1	-	3	Offline	PP
2.	270302	DC	Design & Analysis of Algorithms	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
3.	270303	DC	Operating System	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
4.	270304	DC	Computer Networks and Protocols	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
5.	270305	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
6.	270306	DLC	Python Programming Lab	-	-	-	-	60	20	20	100	-	1	2	2	Offline	SO
7.	270307	DLC	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	40	-	40	-	-	2	1	Online and Mentoring	SO
8.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	270308	DLC	Summer Internship Project–I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
			Total	250	50	100	100	290	100	60	950	10	6	14	23	-	-
10.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ

^{s} 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   PP: Pen Paper   SO: Submission + Oral

Mode of Teaching Theory Offline	Mode of Teaching Theory Online	Mode of Teaching Theory Blended Offline	Mode of Teaching Theory Blended Online	Lab Offline	NEC Interactive	Mode of Examination Theory PP	Mode of Examination Theory A+O	Mode of Examination Theory MCQ	Lab SO	SlP/ SLP/ NEC SO	Total Credits
04	-	08	04	06	01	15	-	-	07	01	23
17.39%	-	34.78%	17.39%	26.09%	04.35%	65.22%	-	-	30.43%	4.35%	Credits %

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Department of Information Technology

Scheme of Evaluation

B. Tech. IV Semester (*Artificial Intelligence (AI) and Data Science*)

(for batch 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	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation			Continuous Evaluation								
				End Sem. Exam.	^{S}Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assign ment	End Sem. Exam.	Lab Work & Sessional	Skill Based Mini Project							
1.	270401	DC	Computer Architecture and Microprocessor	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP
2.	270402	DC	Cloud Computing	50	10	20	20	.	.	.	100	3	-	-	3	Blended	PP
3.	270403	DC	Software Engineering	50	10	20	20	60	20	20	200	3	-	2	4	Blended	MCQ
4.	270404	DC	Machine Learning and Optimization	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP
5.	270405	DC	Network & Web Security	50	10	20	20	.	.	.	100	3	-	-	3	Blended	PP
6.	270406	DLC	Design and Thinking Lab	.	.	.	.	60	20	20	100	-	-	2	1	Offline	SO
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	.	.	.	.	50	.	.	50	-	-	2	1	Interactive	SO
	Total			250	50	100	100	290	80	80	950	14	01	10	20	.	.
8.	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	.	.	.	100	2	-	-	GRADE	Online	MCQ

Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester

^{S} 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   PP: Pen Paper   SO: Submission + Oral

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	A+O	MCQ	SO	SO	
-	-	15	04	01	12	-	03	04	01	20
-	-	75%	20%	5%	60%	-	15%	20%	5%	Credits %

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Department of Information Technology
Scheme of Evaluation
B. Tech. V Semester (Artificial Intelligence (AI) and Data Science)

(for batch admitted in academic session 20__-__)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	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.	270501	DC	Information Retrieval	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP
2.	270502	DC	Data Science using Python	50	10	20	20	60	20	20	200	3	-	2	4	Blended	MCQ
3.	270503	DC	Theory of Computation	50	10	20	20	60	20	20	200	2	-	2	4	Blended	PP
4.	270504	DC	Computer Graphics & Multimedia	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP
5.	270505	DC	Soft Computing Techniques	50	10	20	20	-	-	-	100	3	-	-	3	Blended	PP
6.	270506	DLC	Minor Project-I **	-	-	-	-	60	40	-	100	-	-	4	2	Offline	SO
7.	270507	Seminar/ Self-Study	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)#	-	-	-	-	-	40	-	40	-	-	2	1	Online and Mentoring	SO
8.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	270508	DLC	Summer Internship Project-II (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
			Total	250	50	100	100	350	140	60	1050	12	03	18	24	-	-
10.	1000006	MAC	Disaster Management	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ

Additional Course for Honours or minor Specialization	Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization

$ 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   PP: Pen Paper   SO: Submission + Oral

The minor project-I may be evaluated by an internal committee for awarding sessional marks.

Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	AO	MCQ	SO	SO	
-	-	15	08	01	12	-	03	08	01	24
-	-	62.50%	33.33%	4.17%	50.00%	-	12.50%	33.33%	4.17%	Credits %

Madhav Institute of Technology & Science Gwalior

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

Accredited with A++ Grade

Centre for Artificial Intelligence

Scheme of Evaluation

B. Tech. VI Semester *(Artificial Intelligence (AI) and Data Science)*

S. No.	Subject Code	Category Code	Subject Name	Theory Slot End Term Evaluation - End Sem. Exam.	Theory Slot End Term Evaluation - Proficiency in subject /course	Theory Slot Continuous Evaluation - Mid Sem. Exam.	Theory Slot Continuous Evaluation - Quiz/ Assignment	Practical Slot End Sem. Exam.	Practical Slot Continuous Evaluation - Lab work & Sessional	Practical Slot Continuous Evaluation - Skill Based Mini Project	MOOCs Assignment	MOOCs Exam	Total Marks	L	T	P	Total Credits	Mode of Teaching	Mode of Exam
1.	270601	DC	Data Mining & Warehousing	50	10	20	20	60	20	20	-		200	2	1	2	4	Blended	PP
2.	270602	DC	Image Processing	50	10	20	20	60	20	20	-		200	3	-	2	4	Blended	PP
3.	270603	DC	Deep Learning	50	10	20	20	60	20	20	-		200	3	-	2	4	Blended	PP
4.	DE	DE	Departmental Elective* (DE-1)	-	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ
5.	OC	OC	Open Category (OC-1)	50	10	20	20	-	-	-	-		100	3	-	-	3	Blended	PP
6.	270604	DLC	Minor Project-II**	-	-	-	-	60	40	-	-		100	-	-	4	2	Offline	SO
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-			-	50	-	-	-		50	-	-	2	1	Interactive	SO
			Total	200	40	80	80	290	100	60	25	75	950	14	1	12	21	-	-
8.	1000007	MAC	Intellectual Property Rights (IPR)	50	10	20	20	-	-	-	-		100	1	-	-	GRADE	Online	MCQ

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

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

MCQ: Multiple Choice Question   AO: Assignment + Oral   PP: Pen Paper   SO: Submission + Oral

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	AO	MCQ	SO	SO	
-	3	12	5	1	12	-	3	5	1	21
-	14.29	57.14	23.81	4.76	57.14	-	14.29	23.81	4.76	Credit %

Madhav Institute of Technology & Science Gwalior (M.P.)

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NAAC Accredited with A++ Grade

Centre for Artificial Intelligence

B. Tech. VI Semester *(Artificial Intelligence (AI) and Data Science)*

DE -1*		
S. No.	Subject Code	Subject Name
1	270661	Data Science for Engineers
2	270662	Business Intelligence & Analytics
3	270663	Blockchain and its Applications
4	270664	Compiler Design

OC-1		
S. No.	Subject Code	Subject Name
1		Information Security
2		Data Mining & Warehousing

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

Honours*				
(to be opted by students of Parent Department)				
Course Code	Course Name		Course Code	Course Name
Track 1: Information Security			Track 2: IoT	
AI0624H1	Secure Computation: Part I		AI0624H3	Sensors and actuators
AI0624H2	Information Security- 5 - Secure Systems Engineering		AI0624H4	Microprocessors and Microcontrollers
			AI0523H3	Introduction To Internet Of Things
Track 3: High Performance Computing				
AI0624H5	Parallel Computer Architecture			
AI0624H6	GPU Architectures and Programming			

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

Note: In each semester (starting from V to VIII semester), it is required to opt for new subjects towards Honours Degree/ Minor Specialization.