Curriculum and Syllabus

(Applicable to students admitted during AY 2024–25)

M Tech CSE (Artificial Intelligence & Machine Learning)

Modified Scheme of Exams w.e.f. the session 2024-25

M Tech CSE (Artificial Intelligence & Machine Learning)
Modified Scheme of Exams w.e.f. the session 2024-25

Semester-I										
Sr. No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Total**	**Minor Test**	**Major Test**	**Credit**	**Duration of exam (Hrs)**
1	MAT560	Mathematical Foundations for Machine Learning	3	-	-	3	40	60	3	3
2	AML500	Advanced Algorithms and Analysis	3	-	-	3	40	60	3	3
3	AML501	Machine Learning Techniques	3	-	-	3	40	60	3	3
4	AML501L	Machine Learning Techniques Lab	-	-	4	4	40	60	2	3
5	AML502	Artificial Intelligence and Knowledge Representation	3	-	-	3	40	60	3	3
6	AML502L	Artificial Intelligence and Knowledge Representation Lab	-	-	4	4	40	60	2	3
7		Elective-I	3	-	-	3	40	60	3	3
8		Audit Course-I	2	-	-	2	100	-	-	3
		Total	17		8	25	280	420	19	

Semester-II										
Sr. No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Total**	**Minor Test**	**Major Test**	**Credit**	**Duration of exam (Hrs.)**
1	MAT561	Optimization Techniques	3	-	-	3	40	60	3	3
2	AML504	Data Warehousing and Pattern Mining	3	-	-	3	40	60	3	3
3	AML504L	Data Warehousing and Pattern Mining Lab	-	-	4	4	40	60	2	3
4	AML505	Deep Learning Techniques	3	-	-	3	40	60	3	3
5	AML505L	Deep Learning Techniques Lab	-	-	4	4	40	60	2	3
6	AML506	Natural Language Computing	3	-	-	3	40	60	3	3
7		Elective-II	3	-	-	3	40	60	3	3
8	RM101	Research Methodology and IPR	2	-	-	2	40	60	2	3
9		Audit Course-II	2	-	-	2	100	-	-	3
		Total	19	-	8	27	320	480	21	

Semester-III										
Sr. No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Total**	**Minor Test**	**Major Test**	**Credit**	**Duration of exam (Hrs.)**
1		Open Elective	3	-	-	3	40	60	3	3
2		Elective – III	3	-	-	3	40	60	3	3
3	AML580	Project Work-Phase I	-	-	20	20	100	-	10	3
		Total	6	-	20	26	180	120	16	

Semester-IV										
Sr. No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**Total**	**Minor Test**	**Major Test**	**Credit**	**Duration of exam (Hrs.)**
1	AML581	Project Work-Phase II	-	-	32	32	100	200	16	-
						Total	100	200	16	

Total Credit -72

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Program Elective-I					
Course Code	**Course Name**	**L**	**T**	**P**	**C**
AML551	Modeling and Simulation of Digital Systems	3	0	0	3
AML552	Knowledge Engineering and Expert Systems	3	0	0	3
AML553	Information Retrieval	3	0	0	3

Program Elective-II					
Course Code	**Course Name**	**L**	**T**	**P**	**C**
AML554	Pattern recognition	3	0	0	3
AML555	Problem Solving Methods in Artificial Intelligence	3	0	0	3
AML556	Cognitive system	3	0	0	3

Program Elective-III					
Course Code	**Course Name**	**L**	**T**	**P**	**C**
AML557	Introduction to High Performance Computing	3	0	0	3
AML558	Computer Vision	3	0	0	3
AML559	Number theory and Cryptography	3	0	0	3

Open Elective					
Course Code	**Course Name**	**L**	**T**	**P**	**C**
AML560	Agent Systems	3	0	0	3
AML561	Artificial Intelligence and Neural Networks	3	0	0	3
AML562	Statistical Modeling for Computer Sciences	3	0	0	3
AML563	Fuzzy Logic and its Applications	3	0	0	3
AML564	Electronic Design Automation	3	0	0	3

Audit Courses-I					
Course No.	**Subject**	**L**	**T**	**P**	**C**
MTAD-101	English for Research Paper Writing	2	0	0	0
MTAD-103	Disaster Management	2	0	0	0

Audit Course-II					
Course No.	**Subject**	**L**	**T**	**P**	**C**
MTAD-105	Sanskrit for Technical Knowledge	2	0	0	0
MTAD-107	Value Education	2	0	0	0

M Tech CSE (Artificial Intelligence & Machine Learning)

AUDIT COURSE-I

Course Code	Course Name	Course Category	Credits							
			L	T	P	C	Minor Test	Major Test	Total	Time (Hrs)
MTA D- 101	English for Research Paper Writing		2	0	0	0	100	-	100	3
Purpose	To develop clear, concise, and effective research writing skills for academic and professional excellence.									
Course Outcomes (CO)										
CO1	To enhance clarity, conciseness, and structure in research writing.									
CO2	To improve clarity, attribution, and structure in research writing.									
CO3	To develop key skills for writing titles, abstracts, introductions, and literature reviews effectively									
CO4	To enhance writing skills for Methods, Results, Discussion, Conclusions, and ensure a strong first-time submission.									

UNIT I

Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

UNIT II

Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

UNIT III

Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.
Key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature

UNIT IV

Skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions

Useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

TEXTBOOKS :

1. Gold bort R (2006) Writing for Science, Yale University Press (available on Google Books).
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press.
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011.

Note for paper setter: Nine questions will be set in all. Question No. 1, which will be an objective/ short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set section-wise, with two questions from each unit. The candidate will be required to attempt FIVE questions in all with Q.1 (compulsory) and four other questions, selecting one question from each unit. A question paper template will also be provided.

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AUDIT COURSE-I

Course Code	Course Name	Course Category	Credits							
			L	T	P	C	Minor Test	Major Test	Total	Time (Hrs)
MTAD-103	Disaster management		2	0	0	-	100	-	100	3
Purpose	To provide students with the knowledge and skills to effectively plan, respond to, and recover from natural and man-made disasters									
Course Outcomes (CO)										
CO1	To provide students with a clear understanding of disasters, their causes, types, and magnitudes, and the distinction between hazards and disasters.									
CO2	To equip students with an understanding of the economic, environmental, and human impacts of both natural and man-made disasters									
CO3	To provide students with the knowledge to assess disaster-prone areas, evaluate risks using various data sources, and understand preparedness									
CO4	To equip students with the concepts, techniques, and strategies for disaster risk assessment, reduction, and mitigation									

Unit –1

Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

Unit 2

Repercussions of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks AndSpills, Outbreaks Of Disease And Epidemics, War And Conflicts.

Unit 3

Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

Unit 4

Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment.Strategies for Survival.Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation.Structural Mitigation and Non-Structural Mitigation, Programs Of Disaster Mitigation in India.

TEXTBOOKS :

1. "Natural Disasters and Man-made Hazards" by P.K. Saha and A. G. B. Dube
2. "Environmental Hazards: Assessing Risk and Reducing Disaster" by Keith Smith

REFERENCES BOOKS :

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal book Company.
2. Sahni, PradeepEt.Al. (Eds.)," Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.
3. Goel S. L., Disaster Administration And Management Text And Case Studies",Deep& Deep Publication Pvt. Ltd., New Delhi.

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AUDIT COURSE-II

Course Code	Course Name	Course Category	Credits							
			L	T	P	C	Minor Test	Major Test	Total	Time (Hrs)
MTAD-105	Sanskrit for Technical Knowledge		2	0	0	0	100	-	100	3
Purpose	To enable students to explore and understand the use of Sanskrit in scientific, mathematical, and technical contexts									
Course Outcomes (CO)										
CO1	To provide students with a foundational understanding of Sanskrit alphabets, tenses, and sentence structure for effective communication									
CO2	To familiarize students with the structure, roots, and technical aspects of Sanskrit literature									
CO3	To provide students with an understanding of technical concepts in Sanskrit related to electrical and mechanical engineering, bridging ancient									
CO4	To introduce students to technical concepts in Sanskrit related to engineering fields like architecture and mathematics									

Unit-1

Alphabets in Sanskrit, Past/Present/Future Tense, Simple Sentences.

Unit – 2

Order, Introduction of roots, Technical information about Sanskrit Literature

Unit –3

Technical concepts of Engineering: Electrical, Mechanical

Unit –4

Technical concepts of Engineering: Architecture, Mathematics

TEXTBOOKS :

1. "Sanskrit Grammar" by William Dwight Whitney
2. "The Sanskrit Language" by T. W. Rhys Davids

REFERENCES BOOKS :

1. "AbhyasaPustakam" – Dr.Vishwas, Samskrita-Bharati Publication, New Delhi
2. "Teach Yourself Sanskrit" PrathamaDeeksha-VempatiKutumbshastri, Rashtriya Sanskrit Sansthan, New Delhi Publication
3. "India's Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi.

Note for paper setter: Nine questions will be set in all. Question No. 1, which will be an objective/ short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set section-wise, with two questions from each unit. The candidate will be required to attempt FIVE questions in all with Q.1 (compulsory) and four other questions, selecting one question from each unit. A question paper template will also be provided.

Course Code	Course Name	Course Category	Credits							
			L	T	P	C	Minor Test	Major Test	Total	Time (Hrs)
MTAD-107	Value Education		2	0	0	0	100	-	100	3
Purpose	To promote moral, ethical, and social values, fostering holistic development and responsible citizenship among students									
Course Outcomes (CO)										
CO1	To help students develop a strong sense of social and individual values, work ethics, and moral reasoning									
CO2	Instill essential values such as duty, self-reliance, truthfulness, honesty, patriotism									
CO3	To enhance students' personality and behavior by promoting positive thinking, integrity, discipline, emotional									
CO4	To foster character development and competence by promoting values like self-management, nonviolence, humility									

Unit-1

Values and self-development –Social values and individual attitudes.Work ethics, Indian vision of humanism.Moral and non- moral valuation.Standards and principles.Valuejudgements.

Unit 2

Importance of cultivation of values.Sense of duty.Devotion, Self-reliance.Confidence, Concentration. Truthfulness, Cleanliness.Honesty, Humanity.Power of faith, National Unity.Patriotism.Love for nature, Discipline

Unit 3

Personality and Behavior Development - Soul and Scientific attitude.PositiveThinking.Integrity and discipline.Punctuality, Love and Kindness. Avoid Fault Thinking. Free from anger, Dignity of labour. Universal brotherhood
and religious tolerance. True friendship. Happiness Vs suffering, love for truth. Aware of self-destructive habits.Association and Cooperation. Doing best for saving nature

Unit 4

Character and Competence –Holy books vs Blind faith.Self-management and Good health.Science of reincarnation.Equality, Nonviolence, Humility, Role of Women.All religions and the same message. Mind your Mind, Self-control. Honesty, Studying effectively

TEXTBOOKS :

1. “Value Education and Human Rights” by R.P. Pathak
2. “Ethics and the Conduct of Business” by John R. Boatright

REFERENCES BOOKS :

1.Chakraborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi

Note for paper setter: Nine questions will be set in all. Question No. 1, which will be an objective/ short answer type covering the entire syllabus, will be compulsory. The remaining eight questions will be set section-wise, with two questions from each unit. The candidate will be required to attempt FIVE questions in all with Q.1 (compulsory) and four other questions, selecting one question from each unit. A question paper template will also be provided.