



MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE (Deemed to be University)



Affiliated to JNTUA, Ananthapuramu & Approved by AICTE, New Delhi
NAAC Accredited with A+ Grade, NIRF India Rankings 2024 - Band: 201-300 (Engg.)
NBA Accredited - B.Tech. (CIVIL, CSE, ECE, EEE, MECH, CST), MBA & MCA

A Report on One Week Online Faculty Development Programme on "Mathematics for AI, Theory and Applications" Organized by Department of Mathematics from 15.06.2026 to 20.06.2026

About MITS Deemed to be University

Madanapalle Institute of Technology & Science (MITS), established in 1996, is a deemed-to-be university under the provisions of the UGC Act, 1956. The Institute is situated at a distance of 15 km from the nearest city, Ananthapuramu. It is governed by the Madanapalle Institute of Technology & Science Society, which is a registered society under the Societies Registration Act, 1860. The Institute is a member of the Association of Universities and Colleges in Andhra Pradesh (AUCAP) and the Association of Universities and Colleges in India (AUCI).

The Institute offers a comprehensive range of undergraduate and postgraduate programs across various disciplines. The undergraduate programs include B.Tech. in Civil Engineering, Mechanical Engineering, Electrical and Electronics Engineering, Computer Science and Engineering, and Information Technology. The postgraduate programs include M.Tech. in Civil Engineering, Mechanical Engineering, and Information Technology, and Ph.D. programs in various disciplines.

The Institute is also a member of the Association of Universities and Colleges in Andhra Pradesh (AUCAP) and the Association of Universities and Colleges in India (AUCI).

About Department

The Department of Mathematics, established in 1996, is a deemed-to-be department under the provisions of the UGC Act, 1956. The Department is situated at a distance of 15 km from the nearest city, Ananthapuramu. It is governed by the Madanapalle Institute of Technology & Science Society, which is a registered society under the Societies Registration Act, 1860. The Department is a member of the Association of Universities and Colleges in Andhra Pradesh (AUCAP) and the Association of Universities and Colleges in India (AUCI).

The Department offers a comprehensive range of undergraduate and postgraduate programs across various disciplines. The undergraduate programs include B.Sc. in Mathematics, B.A. in Mathematics, and B.Com. in Mathematics. The postgraduate programs include M.Sc. in Mathematics, M.A. in Mathematics, and M.Com. in Mathematics.

Chief Guest
Dr. N. Vijaya Bhaskar Choudary
Founder & Chancellor

Patrons
Shri. B. Dasarathan
Hon. Chancellor
Dr. C. T. Venkatesh
Vice-Chancellor (I/C)
Chancellor
Dr. D. Pradeep Kumar
Registrar (I/C)
Dr. P. Ramesh
Principal
Dr. P. Ramesh Reddy
Head - Mathematics
Co-Chancellor
Dr. A. Subbarao
Joint Dean for Year & Tech Physics Stream
Coordinator
Dr. B. Subbarao
Assistant Professor

Organizing Committee
Dr. S. Suresh, Assoc. Professor
Dr. K. V. Venkatesh Reddy, Assoc. Professor
Dr. T. Chaitanya, Asst. Professor
Dr. K. Suresh Kumar, Asst. Professor
Dr. P. Ramesh, Asst. Professor
Dr. P. Ramesh Kumar, Asst. Professor
Dr. T. Hemachandra, Asst. Professor
Dr. P. Manoj, Asst. Professor
Dr. R. Manoj, Asst. Professor
Dr. S. Suresh Kumar, Asst. Professor

MITS
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One Week Online Faculty Development Programme on
"Mathematics for Artificial Intelligence: Theory and Applications"
Organized by the Department of Mathematics
15th June 2026 – 20th June 2026

Resource Persons	
Session-1 Dr. Manoj K. S. Topic: Linear Algebra & Matrix Calculations	Session-2 Dr. Pradeep K. Topic: Graph Theory and Combinatorics
Session-3 Dr. Chaitanya K. V. Topic: Probability and Statistics	Session-4 Dr. Ramesh P. Topic: Optimization and Linear Programming
Session-5 Dr. Ramesh K. P. Topic: Fuzzy Theory and Fuzzy Logic	Session-6 Dr. Anurag A. J. Topic: Game Theory & Game Theory Applications
Session-7 Dr. Suresh V. J. Topic: Emerging Trends in AI and ML	Session-8 Dr. S. Suresh Kumar Topic: Machine Learning and Data Mining
Session-9 Dr. Suresh V. P. Topic: Research in AI and ML	Session-10 Dr. Manoj G. Topic: Optimization Models for Real-world Problems
Session-11 Dr. Manoj V. S. Topic: Probability and Statistics	Session-12 Dr. Anurag S. Topic: Machine Learning and Data Mining

Eligibility to Participate

The Faculty Members of AICTE-recognized Universities and Engineering Colleges, Degree College, Research Institutes, and Industry Professionals are invited to participate.

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About the Programme

This Faculty Development Programme (FDP) aims to provide a comprehensive understanding of the mathematical foundations underlying Artificial Intelligence. The programme covers a wide range of topics including linear algebra, optimization, probability, graph theory, and modern AI applications such as deep learning, computer vision, and physics-informed neural networks.

The sessions are designed to bridge theoretical concepts with practical applications, enabling participants to enhance their teaching and research in emerging AI-related domains.

Objectives

- To strengthen mathematical foundations relevant to AI
- To explore advanced topics in optimization, graph theory, and probabilistic modelling
- To connect mathematical concepts with real-world AI applications
- To enhance research and teaching capabilities in AI-related areas

Registration Details

- Registration fee: 2000 for faculty, 1500 for research scholars and postgraduate students

QR Code for Payment: [QR Code]

Registration Link: <https://forms.gle/AC1d1mZm9eMc7>

QR Code for Registration: [QR Code]

Report Submitted by: Dr. Bibin Mathew, Assistant Professor, Department of Mathematics

Total No. of Registrations: 170 participants

Mode of Delivery: Online (Microsoft Teams)

Report Received on 29.06.2026.

About the FDP

The One Week Online Faculty Development Programme on "Mathematics for AI, Theory and Applications" was organized by the Department of Mathematics, Madanapalle Institute of Technology and Science, Deemed to be University, Madanapalle, with the objective of providing participants with a comprehensive understanding of the mathematical foundations underlying Artificial Intelligence and its modern applications.

The FDP was designed to bridge the gap between theoretical mathematical concepts and emerging AI technologies. The programme brought together eminent academicians and researchers from premier institutions in India and abroad to share their expertise in various domains including linear algebra, graph theory, optimization, fuzzy systems, probability, machine learning, and computer vision.

The programme was conducted through Microsoft Teams and attracted participants from academia, research institutions, and industry.

Objectives

- Strengthen mathematical foundations for AI
- Explore graph theory, optimization, probability and fuzzy systems
- Connect mathematics with AI applications
- Enhance research and teaching capabilities

Inaugural Session

The FDP was inaugurated on 15 June 2026 through Microsoft Teams with a welcome address by Dr. P Ramesh, Assistant Professor, Department of Mathematics. The inaugural session also included addresses by Dr. P. Ramesh Reddy, Head, Department of Mathematics, and Dr. D. Pradeep Kumar, Registrar (I/c), Madanapalle Institute of Technology and Science, Deemed to be University. Dr. D. Pradeep Kumar presented an overview of the university, highlighting its academic achievements, research ecosystem, and commitment to quality education, while Dr. P. Ramesh Reddy provided insights into the academic and research activities of the Department of Mathematics. Dr. Bibin Mathew outlined the objectives, structure, and expected outcomes of the FDP, emphasizing the crucial role of mathematics in the development of Artificial Intelligence and its applications. The speakers highlighted the growing importance of mathematical foundations in modern AI technologies and encouraged participants to explore emerging research opportunities at the intersection of Mathematics and Artificial Intelligence.



Day-wise Session Report

Day 1 : 15 June 2026

Session 1

Speaker: Dr. Minirani S

Topic: *Linear Algebra in AI*

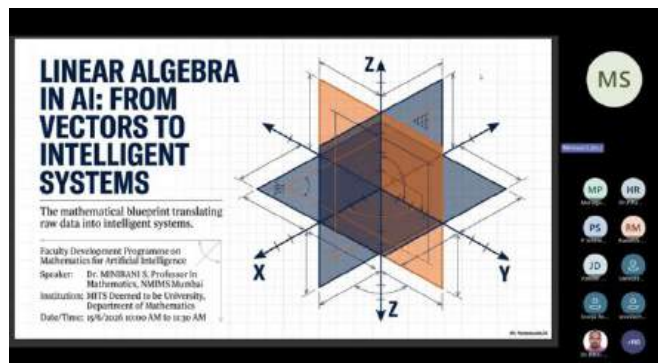
Dr. Minirani S delivered an insightful session on the fundamental role of linear algebra in Artificial Intelligence. She explained how vectors, matrices, eigenvalues, eigenvectors, and linear transformations form the mathematical backbone of machine learning algorithms. The session highlighted applications of matrix operations in data representation, dimensionality reduction, recommendation systems, and neural networks. Participants gained a clear understanding of how linear algebra enables efficient processing and analysis of large-scale data in AI systems.

Session 2

Speaker: Dr. K. Palpandi

Topic: *Low-Rank Approximations and Principal Component Analysis*

The session focused on the importance of low-rank matrix approximations in data science and machine learning. Dr. Palpandi explained concepts such as Singular Value Decomposition (SVD), matrix factorization, and Principal Component Analysis (PCA), demonstrating how these techniques are used for dimensionality reduction, feature extraction, and noise removal. The session provided participants with valuable insights into handling high-dimensional datasets and improving computational efficiency in AI applications.



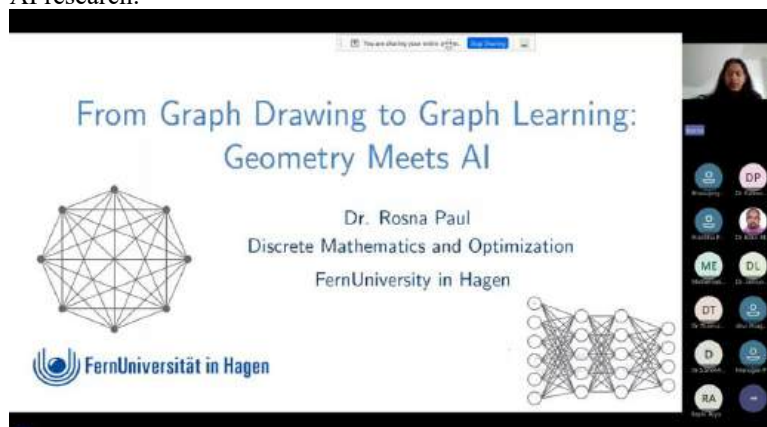
Day 2 : 16 June 2026

Session 3

Speaker: Dr. Rosna Paul

Topic: *From Graph Drawing to Graph Learning: Geometry Meets AI*

Dr. Rosna Paul introduced participants to the fascinating relationship between graph theory, geometry, and Artificial Intelligence. The session explored graph representations, graph drawing techniques, and their evolution into modern graph learning frameworks. Participants learned how graph-based methods are applied in social networks, recommendation systems, biological networks, and knowledge graphs. The session effectively demonstrated the growing significance of graph learning in contemporary AI research.



Session 4

Speaker: Dr. Shyaman V. P.

Topic: Artificial Intelligence in Mathematics: From Numerical Methods to Modern Applications

This session highlighted the integration of Artificial Intelligence with mathematical modelling and numerical computation. Dr. Shyaman V. P. discussed how AI techniques can enhance traditional numerical methods and solve complex real-world problems. Through various examples and applications, participants gained an understanding of the role of AI in optimization, prediction, simulation, and scientific computing.

Day 3 : 17 June 2026

Session 5

Speaker: Dr. Ratheesh K. P.

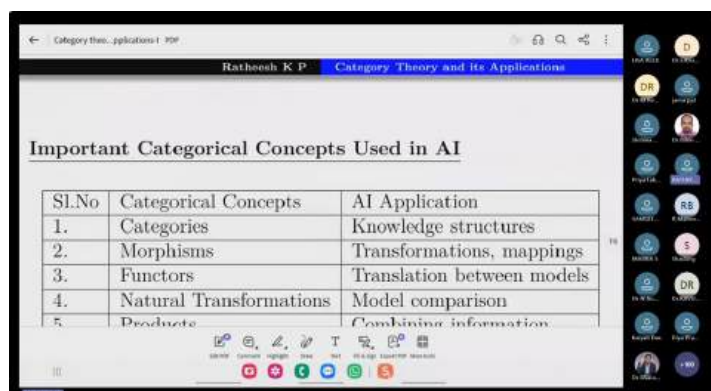
Topic: Category Theory and its Applications Dr. Ratheesh K. P. introduced Category Theory as a powerful mathematical framework that provides a unified perspective for studying mathematical and computational structures. The session covered fundamental concepts including categories, morphisms, functors, and natural transformations. Participants were exposed to the applications of category theory in computer science, programming languages, and abstract mathematical modelling, offering a fresh perspective on modern mathematical thinking.

Session 6

Speaker: Dr. Jinny Ann John

Topic: AI Enabled Research and Teaching

The session focused on the transformative role of Artificial Intelligence in academic research and education. Dr. Jinny Ann John demonstrated various AI-powered tools and platforms that can support literature review, content creation, data analysis, assessment design, and personalized learning. The session provided practical guidance on integrating AI into teaching and research workflows while emphasizing responsible and ethical use of AI technologies.



Sl.No	Categorical Concepts	AI Application
1.	Categories	Knowledge structures
2.	Morphisms	Transformations, mappings
3.	Functors	Translation between models
4.	Natural Transformations	Model comparison
5.	Products	Combining information

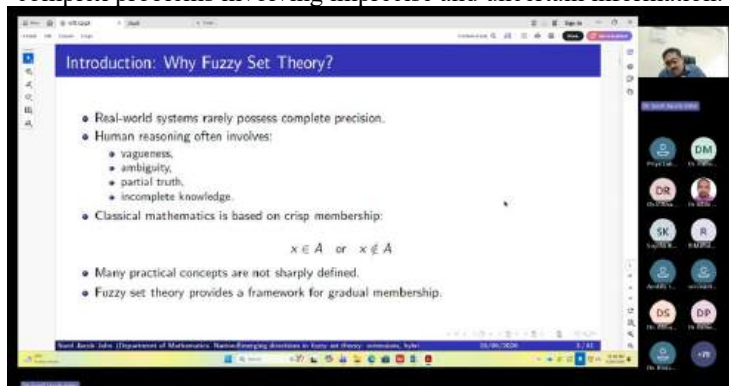
Day 4 : 18 June 2026

Session 7

Speaker: Dr. Sunil Jacob John

Topic: Emerging Directions in Fuzzy Set Theory: Extensions, Hybrid Frameworks and Decision-Making Applications

Dr. Sunil Jacob John presented recent developments and emerging trends in fuzzy set theory. The session explored advanced fuzzy models, hybrid frameworks, and their applications in decision-making under uncertainty. Participants gained exposure to current research directions and learned how fuzzy approaches are increasingly being used to address complex problems involving imprecise and uncertain information.



Introduction: Why Fuzzy Set Theory?
- Real-world systems rarely possess complete precision. - Human reasoning often involves: - vagueness, - ambiguity, - partial truth, - incomplete knowledge. - Classical mathematics is based on crisp membership:$x \in A \text{ or } x \notin A$ - Many practical concepts are not sharply defined. - Fuzzy set theory provides a framework for gradual membership.

Session 8

Speaker: Dr. V. Lakshmana Gomathi Nayagam

Topic: Fuzzy Information Modelling and Applications

This session focused on the principles and methodologies of fuzzy information modelling. The speaker discussed techniques for representing uncertainty, managing incomplete information, and developing intelligent decision-support systems. Several practical applications from engineering, management, and data analysis were presented, demonstrating the versatility and effectiveness of fuzzy methodologies.

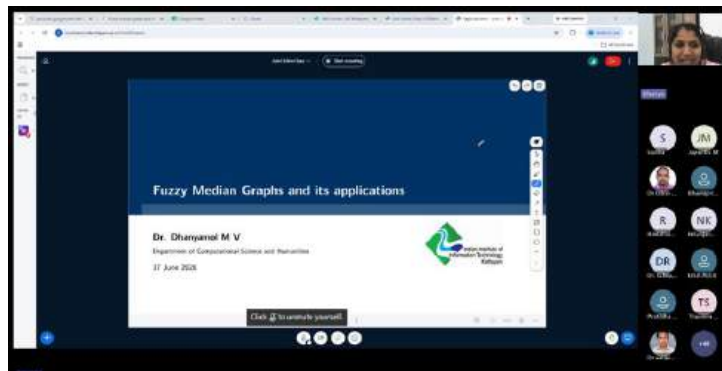
Day 5 : 19 June 2026

Session 9

Speaker: Dr. Dhanyamol M. V

Topic: Median Graphs and Applications in Network Clustering

Dr. Dhanyamol M. V. delivered an engaging session on median graphs and their applications in network analysis. The session introduced the structural properties of median graphs and explained their usefulness in clustering and optimization problems. Participants learned how graph-theoretic concepts can be employed to analyze complex networks and facilitate efficient data organization and decision-making.



Session 10

Speaker: Dr. Harish Garg

Topic: Optimization Models for Preventive Maintenance Scheduling and Decision-Making

Dr. Harish Garg discussed the role of optimization techniques in maintenance planning and decision support systems. The session covered mathematical modelling approaches for preventive maintenance scheduling, resource allocation, and operational efficiency. Through practical examples, participants gained insights into how optimization models can support intelligent decision-making in industrial and engineering environments.

Day 6 : 20 June 2026

Session 11

Speaker: Dr. Jobish V. Devassia

Topic: Probability in AI

Dr. Jobish V. Devassia emphasized the significance of probability theory in Artificial Intelligence and machine learning. The session covered probabilistic reasoning, uncertainty modelling, Bayesian approaches, and statistical learning concepts. Participants developed a deeper appreciation of how probability enables AI systems to make informed decisions in uncertain environments and supports predictive analytics.

Session 12

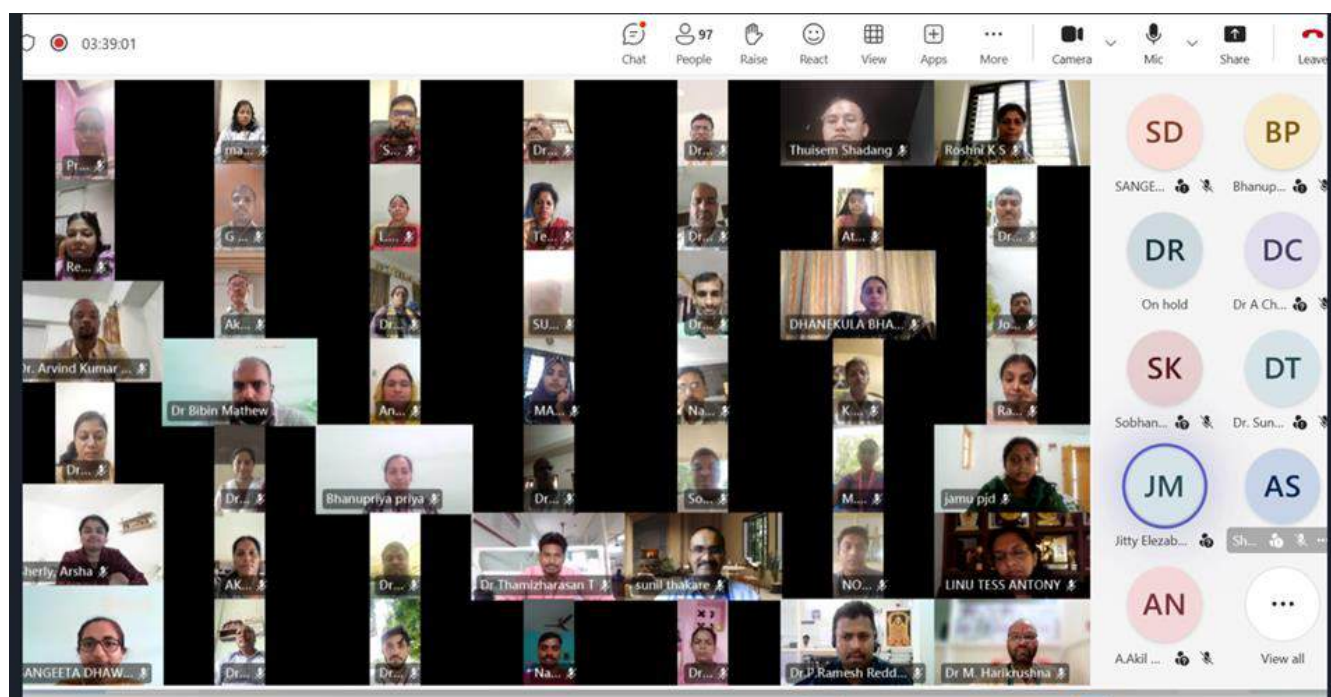
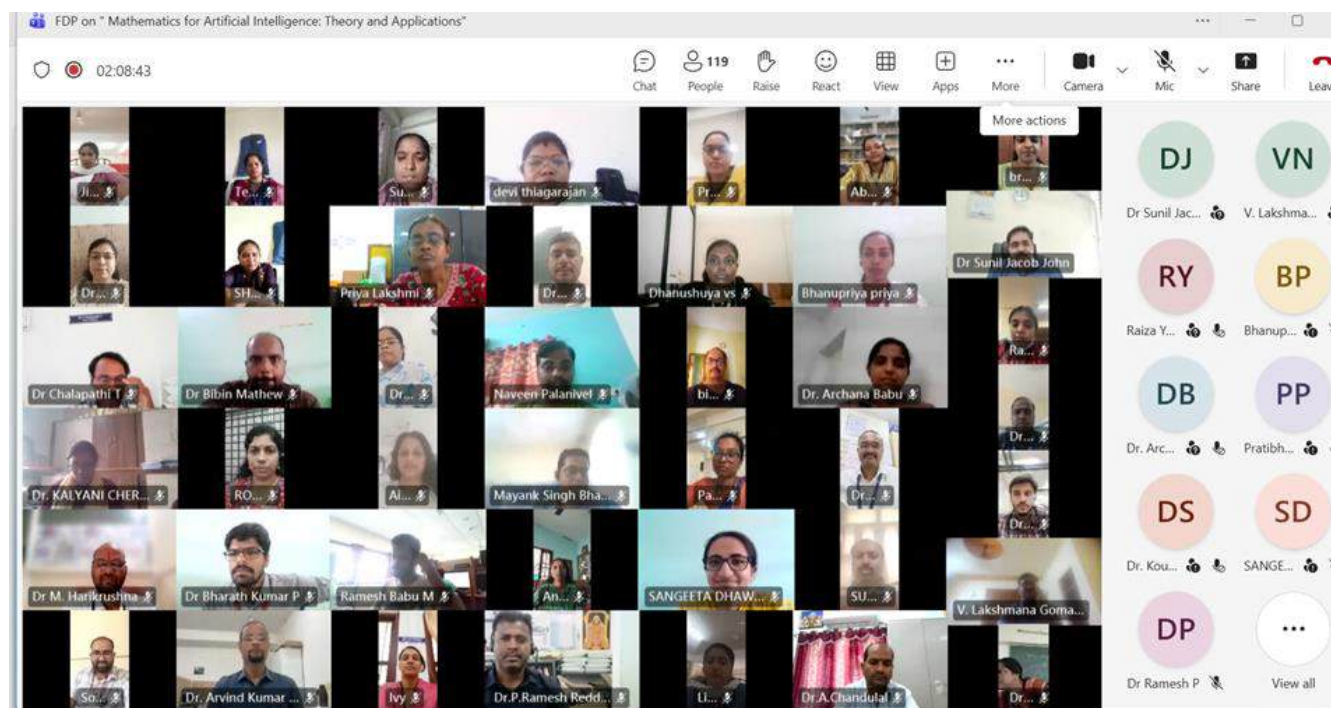
Speaker: Dr. Arsha Sherly

Topic: From Linear Regression to Object Detection: The Mathematics of Computer Vision

The concluding session of the FDP explored the mathematical foundations of computer vision. Dr. Arsha Sherly discussed concepts ranging from linear regression and feature extraction to image processing and object detection algorithms. The session demonstrated how mathematical models, optimization techniques, and machine learning methods collectively contribute to modern computer vision systems used in autonomous vehicles, healthcare, surveillance, and intelligent automation.



Group Photo sessions



FDP Outcomes

The FDP enabled participants to:

- Develop a strong understanding of mathematical foundations of AI.
- Gain exposure to contemporary research trends in Artificial Intelligence.
- Understand interdisciplinary applications of Mathematics.
- Learn advanced mathematical techniques used in machine learning and data science.
- Explore research opportunities in AI-related mathematical domains.
- Enhance teaching and research capabilities in emerging technologies.

Participant Feedback Summary

The **Online Faculty Development Program (FDP)** received feedback from the participants including faculty members, research scholars and students from various institutions. Feedback was collected through online Microsoft forms after the end of each session. The outcome of the feedback is summarized as follows:



Mapping with Sustainable Development Goals (SDGs)

The One Week Online Faculty Development Programme on *"Mathematics for AI, Theory and Applications"* aligns with several United Nations Sustainable Development Goals (SDGs), particularly **SDG 4: Quality Education**, by promoting lifelong learning, enhancing faculty competencies, and fostering innovation in teaching and research. The programme also supports **SDG 9: Industry, Innovation and Infrastructure** by encouraging the application of mathematical models and Artificial Intelligence in solving real-world industrial and technological challenges. Furthermore, by promoting interdisciplinary research, knowledge sharing, and collaboration among academicians and researchers, the FDP contributes to **SDG 17: Partnerships for the Goals**, strengthening academic networks and collaborative efforts towards sustainable scientific and technological development.

Conclusion

The One Week Online Faculty Development Programme on *"Mathematics for AI, Theory and Applications"* successfully achieved its objectives by providing participants with a comprehensive understanding of the mathematical principles underlying modern Artificial Intelligence. The programme served as an excellent platform for knowledge sharing, academic interaction, and interdisciplinary collaboration. The active participation of faculty members, research scholars, and experts contributed significantly to its success.

The FDP demonstrated the crucial role of Mathematics in advancing Artificial Intelligence and inspired participants to explore further research and innovation in this rapidly evolving field.

Impact of the FDP on Teaching, Research and Industry Collaborations

The One Week Online Faculty Development Programme on *"Mathematics for AI Theory and Applications"* created a meaningful impact on teaching, research, and interdisciplinary collaborations by enhancing participants' understanding of the mathematical foundations underlying modern Artificial Intelligence. The programme enabled faculty members to integrate contemporary AI-related concepts into their teaching, adopt innovative technology-enabled pedagogical approaches, and connect mathematical theories with real-world applications. Through interactions with eminent experts from India and abroad, participants gained exposure to emerging research areas such as graph learning, optimization, fuzzy systems, probability, and computer vision, thereby opening new avenues for interdisciplinary research and collaboration. The FDP also highlighted the practical applications of mathematical models in industry-oriented domains including machine learning, data analytics, intelligent decision-making, and predictive modelling, motivating participants to explore collaborative projects, consultancy opportunities, and research initiatives that bridge academia and industry.

Acknowledgement

We thank the **Management of Madanapalle Institute of Technology and Science, Deemed to be University Madanapalle** for allowing us to conduct this faculty development program. The organising team expresses sincere gratitude to **Dr. C. Yuvaraj, Vice Chancellor (I/C), Dr. D. Pradeep Kumar, Registrar (I/C) and Dr. P. Ramanathan, Principal** for providing all the financial and logistic support for this program.

Our special thanks to **Dr. P Ramesh Reddy, HOD, Department of Mathematics and Dr. A. Subba Rao, Assistant Dean** for their initiation and constant motivation throughout the program. We also appreciate our **distinguished resource persons** for accepting our request and giving time and effort to deliver the sessions.

We thank all the **faculty members and staff of Mathematics department** who helped in the successful completion of the program. Finally, we sincerely thank all the **participants** for their enthusiastic participation and contribution for making this FDP successful.