

## Report On

# **DST STUTI Program Funded 7-Day Training Program on “ROLE OF IOT & MACHINE LEARNING IN DESIGN AND MANUFACTURING” - July 2022.**

**Date: 11<sup>th</sup> – 17<sup>th</sup> July 2022**

**Venue: Aditya Institute of Technology and Management (AITAM), Tekkali, Srikakulam District, 532201, Andhra Pradesh.**

The inauguration of DST Funded 7-Day Training Program on “ROLE OF IOT & MACHINE LEARNING IN DESIGN AND MANUFACTURING” from 11<sup>th</sup> to 17<sup>th</sup> July 2022, organised at Aditya Institute of Technology and Management (AITAM), Tekkali, Srikakulam District, 532201, in collaboration with GITAM DEEMED TO BE UNIVERSITY, VISAKHAPATNAM under STUTI Program-2021 (DST/RND/STUTI/2021/18) took place on 11<sup>th</sup> July at 9:30 am.

## **INAUGURAL**

Prof. V.V. Nagesawara Rao, Director AITAM; Chief Guests Dr. P. Jagadeeswara Rao, Director, RGUKT IIIT, Srikakulam, AP; Dr G B Veeresh Kumar, Dean Student Welfare, NIT, Andhra Pradesh.



Figure 1: Chief Guest Dr. P. Jagadeeswara Rao, Director, RGUKT IIIT, Srikakulam, AP, addressing the gathering at the inaugural.

STUTI program coordinator, Dr. Balla Srinivasa Prasad from GITAM Deemed to be University; Training program convener Dr. D. Sreeramulu and Training program coordinator from AITAM,

Dr. Ch. Ramesh inaugurated the event by lightening the lamp. The training program coordinator from AITAM, Dr. Ch. Ramesh, gave a brief about the one-week program. STUTI program coordinator Dr. Balla Srinivasa Prasad briefly explained the STUTI program and the importance of collaborating with other organisations. Prof. V.V. Nagesawara Rao gave a brief about the research facilities available at AITAM, Tekkali and congratulated the organisers for their initiative. Chief Guest Dr. P. Jagadeeswara Rao, Director, RGUKT IIIT, Srikakulam, AP, briefed about the importance of Hands-on experience in research. He explained the importance of IoT to the present generation and student community. He also explained its use for the country's development, among agriculture and aeronautics, leading innovation and research to the next level. He motivated the participants with his valuable speech. The event was graced by participants from various engineering colleges throughout Andhra and Telangana, along with the management and faculty members of AITAM. The training program is scheduled from 11<sup>th</sup> - 17<sup>th</sup> July at Aditya Institute of Technology and Management (AITAM), Tekkali, Srikakulam District, Andhra Pradesh, 532201.

## **DAY-1, 11<sup>th</sup> JULY 2022:**

### **TECHNICAL SESSION:**

The first-day session focused on *“Artificial neural networks for the prediction of properties of materials”* was taken by **Dr Veeresh Kumar G.B**, Dean of Student Welfare, NIT-AP. He lectured on the importance of Artificial Neural Networks (ANN) and said that Artificial neural networks are created to mimic the human brain digitally.



Figure 3: Session by Dr. Veeresh Kumar GB on Artificial neural networks

### **HANDS-ON SESSION:**

Later in the afternoon, the hands-on session was carried out by Dr. Veeresh Kumar G.B on “*Generation of data for machine learning*”. The session taught the participants that artificial data is used to train machine learning models when factual information is difficult or expensive to obtain.

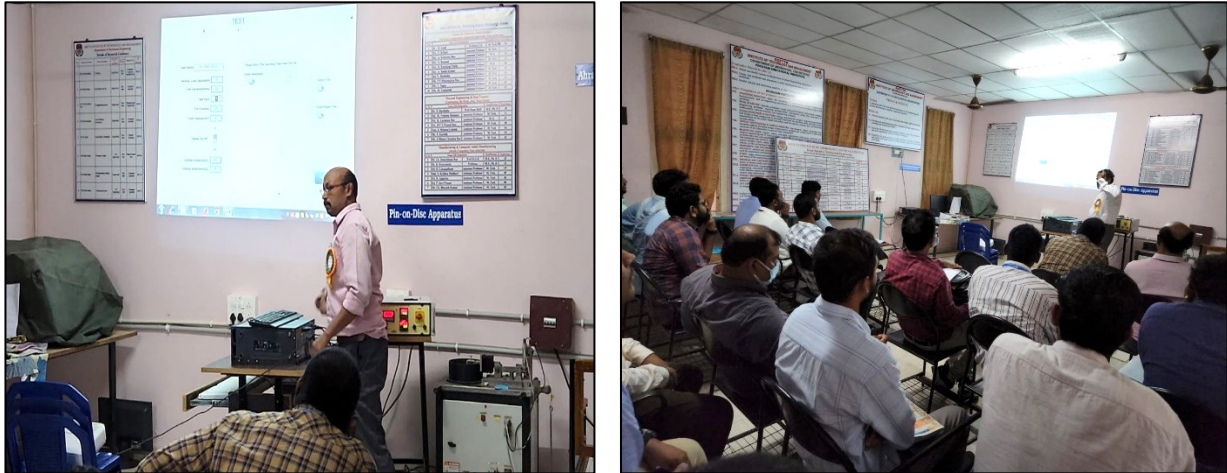


Figure 4: Demonstration of the practical session held at AITAM, Tekkali, Srikakulam

### **DAY-2, 12<sup>TH</sup> JULY 2022:**

#### **TECHNICAL SESSION:**

On day 2, the session started with the topic of “*Manufacturing Execution Systems*” by **Dr. P.S. Rao**, Dean R & D, CUTM, focused on lecturing that a manufacturing execution system (MES) is a software designed to optimise the manufacturing process by monitoring, tracking, documenting, and controlling the entire product lifecycle.



Figure 5: Session by Dr. P.S. Rao on Manufacturing Execution Systems

### HANDS-ON SESSION:

In the afternoon session after lunch, **Dr. Arun Manohar**, Associate Professor at CUTM, conducted a hands-on practical session on the APRISO Quality solution from Dassault Systems. The participants were allowed to learn how to use the software practically. The participants went through and understood the Apriso at the end of the day.



Figure 6: Dr.Arun Manohar, Associate Professor, CUTM, AP, training the participants

### **DAY-3, 13<sup>TH</sup> JULY 2022:**

#### TECHNICAL SESSION:

On day three, **Dr. Jagadeesh**, assistant professor at NIT Raipur and an expert in artificial intelligence techniques, delivered a session on *“Artificial Intelligence Techniques: Concept & Applications in Green Manufacturing Process”*. He discussed the importance of artificial intelligence in daily life and how it can solve complex problems efficiently in multiple industries such as healthcare, entertainment, finance and education.



Figure 7: Session delivered by Dr. Jagadeesh, Assistant Professor, NIT Raipur

### HANDS-ON SESSION:

Later in the afternoon session, the participants' practical hands-on sessions were conducted on the application of ‘*Soft computing techniques in the thermal system: Issues & Challenges*’ faced in the real-time environment.



Figure 8: Practical session on soft computing techniques and 3D printing process

### **DAY-4, 14<sup>TH</sup> JULY 2022:**

#### TECHNICAL SESSION:

On day four, **Dr. N.B. Venkateswarulu**, Professor at Gayatri Vidya Parishad College of Engineering for Women, gave a presentation on "*Applications of IoT and Machine learning in Industry*". He explained that machine learning could help demystify the hidden patterns in IoT data by analysing massive volumes of data using sophisticated algorithms.



Figure 9: Session delivered by Dr.N.B.Venkateswarulu

### HANDS-ON SESSION:

The afternoon sessions focus on training participants in programming. They learn how to write programs related to IoT tools and machine learning applications in digital manufacturing. They understand that AI and ML help increase the relevancy of campaigns.



Figure 10: Practical sessions on robotic programming

### **DAY-5, 15<sup>TH</sup> JULY 2022:**

#### TECHNICAL SESSION:

On the fourth day of class, **Dr. D.Sreeramulu**, HoD-ME, AITAM, delivered a lecture on *“Forward and Inverse Kinematics in Robotics”*. He explained that forward kinematics takes input joint angles and calculates the Cartesian position and orientation of the end effector.



Figure 11: Session delivered by Dr. D.Sreeramulu

### HANDS-ON SESSION:

Later, the afternoon sessions demonstrated hands-on experience solving inverse Kinematics case studies using MATLAB and Robot Programming. Robotics researchers and engineers use MATLAB to design, simulate and verify every aspect of autonomous systems.

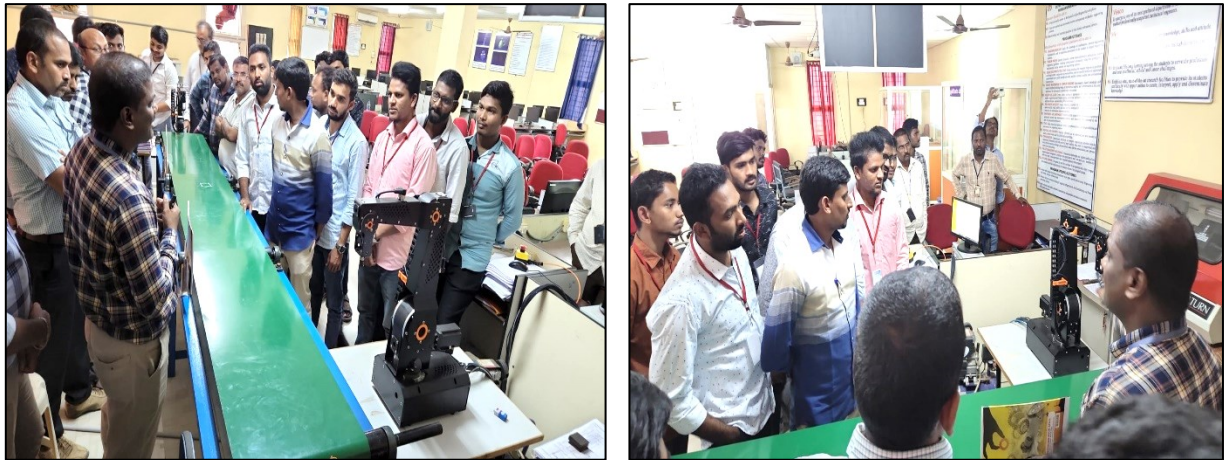


Figure 12: Training and practical session on MATLAB and Robot Programming

### **DAY-6, 16<sup>TH</sup> JULY 2022:**

#### TECHNICAL SESSION:

On day 6, **Dr. K. Venkata Rao, Professor at VIGNAN University**, delivered a lecture on *“Prediction of surface quality and aerosol emissions using OGM (1, N) and ANN in Wire EDM”*. He explained how wire-cut electrical discharge machining (WEDM) is a highly effective technique for cutting hard materials used in modern production industries.



Figure 13: Session by Dr.K. Venkata Rao, Professor

## HANDS-ON SESSION:

Later in the afternoon, Dr.K. Venkata Rao demonstrated how to use machine learning techniques to monitor the performance of a machine tool. He explained why this is important and how it can be used to ensure consistent performance.



Figure 14: Hands-on practical session delivered to the participants

## **DAY-7, 17<sup>TH</sup> JULY 2022:**

### TECHNICAL SESSION:

On day 7, **Prof. Srinivasa Prasad**, Director-R&D of GITAM, delivered a presentation on **"Internet of Things (IoT) can reduce manufacturing cost, improve uptime, and help operators gain process insights"**. During his talk, he gave the insight to explore how we can build such a laboratory-scale system with low-cost electronic sensors. He said this work evaluates the feasibility of using them for condition monitoring in manufacturing.



Figure 15: Session delivered by Prof. Balla Srinivasa Prasad



## **HANDS-ON SESSION:**

In the afternoon, Prof. Balla Srinivasa Prasad gave a hands-on workshop on developing *an IoT-enabled intelligent process monitoring system for CNC milling*. The participants were trained in how to use the devices, as well as in how to build their own IoT devices.

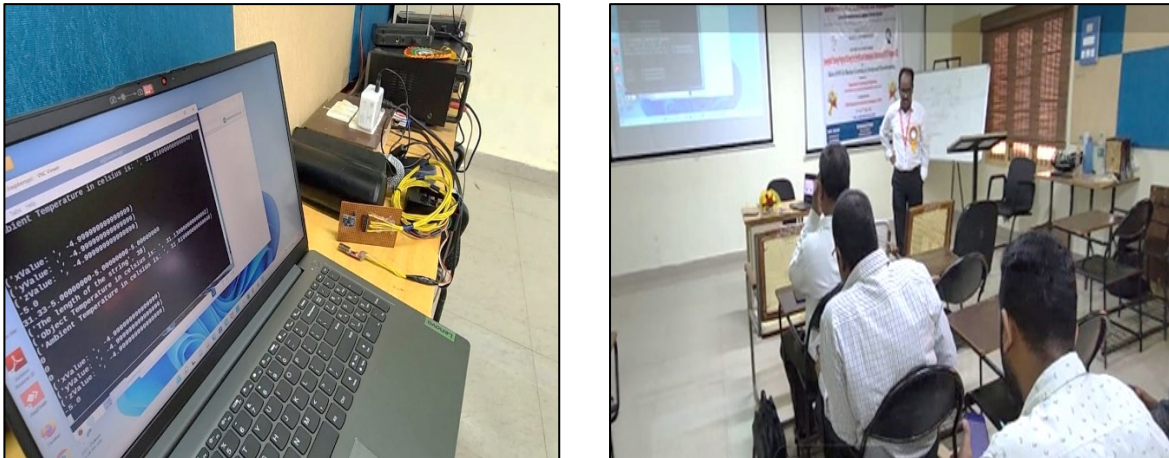


Figure 16: Hands-on live demonstration on IoT-enabled device by Dr Balla Srinivasa Prasad

## **Distribution of Certificates:**



Figure 17: Distribution of certificates to the Participants

Dr B S Prasad, the STUTI program coordinator, congratulated the participants on completing the seven-day training program. Dr. D Sreeramulu, HoD-ME, AITAM (Head of the Mechanical Engineering Department), congratulated them on their accomplishments. Certificates were distributed to each participant as they left the premises.

## VOTE OF THANKS

They are thankful to their Prof. V.V. Nageswara Rao, Director AITAM, and the Chief Guests, Dr. P. Jagadeeswara Rao, Director, RGUKT IIT, Srikakulam; Training program convener Dr. D. Sreeramulu; Training program coordinator from AITAM; and all faculty members for their hard work in making this program a success. Dr. D. Sreeramulu, HoD-ME, AITAM and STUTI program coordinator Prof. Balla Srinivas Prasad congratulated all the participants on completing the seven-day training. The workshop concluded with the national anthem. All the participants dispersed after the group photo session.



Figure 18: Group photo of the participants (30) who attended the 7-day workshop from 11<sup>th</sup> – 17<sup>th</sup> July 2022 at AITAM, Tekkali, Srikakulam, District, Andhra Pradesh.

Regards,

Dr Balla Srinivasa Prasad

STUTI program coordinator (DST/RND/STUTI/2021/18)

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