

Report On

**DST STUTI PROGRAM FUNDED 7-DAY TRAINING PROGRAM ON
DIVERSIFIED RESEARCH AREAS IN MECHANICAL
ENGINEERING (DRAME-2022)**

Date: 6th – 12th April 2022

**Venue: GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING (A),
Visakhapatnam, Andhra Pradesh – 530048.**

The inaugural and start of the DST-funded 7-day training program on "Diverse Research Areas in Mechanical Engineering" (DRAME 2022), which was held at GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING (A), Visakhapatnam – 530048 in collaboration with GITAM INSTITUTE OF TECHNOLOGY, GITAM DEEMED TO BE UNIVERSITY, Visakhapatnam under the STUTI Program-2021, was on April 6. It was started by Dr. A. B. Koteswara Rao, Principal GVPCE(A); Dr. B. Govinda Rao, Head of the department, Mechanical Engineering; Guest of honor Prof. Vijaysekhar Chellaboina, Dean of Engineering, GITAM Deemed to be University; STUTI program coordinator, Dr. Balla Srinivasa Prasad from GITAM Deemed to be University; Training program coordinator from GVPCE(A).

INAUGURATION

Dr. M. Amrita inaugurated the event by lighting a lamp. The training program coordinator from GVPCE (A), Dr. M. Amrita, gave a brief about the one-week program. STUTI program coordinator Dr. Balla Srinivasa Prasad briefly explained about STUTI program and the importance of collaborating with other organisations. Dr. Govinda Rao, Head of the department, gave a brief about the research facility in the mechanical engineering department in GVPCE (A). Dr. A. B. Koteswara Rao, Principal GVPCE (A), gave a brief about the institute and congratulated the participants for being a part of the Training program. Guest of honour, Prof. Vijaysekhar Chellaboina, Dean of Engineering, GITAM, deemed to be university, briefed about the importance of diversification. He opined, "No branch of engineering and science can exist as a single unit; the combination concepts of various disciplines like electrical, electronics, computer sciences, mechanical and mathematics leads the innovation and research to the next level."



Figure 1: Inauguration of Diversified Research Areas in Mechanical Engineering- (DRAME 2022)

Participants from various engineering colleges throughout Andhra Pradesh and Telangana graced the event, along with the management members of GITAM deemed University and Gayatri Vidya Parishad College of Engineering (Autonomous). The schedule of the 7-day program is enclosed at the end of the report.

DAY-1, 6TH APRIL 2022:

TECHNICAL SESSION:

After the inauguration, the technical session focused on robotics taken by **Dr. A. B. Koteswara Rao**, Principal, GVPCE (A), on **“Serial and Parallel robots”**. He said that relatively new segments of automation are rapidly adopting robots.



Figure 3: Technical Session Delivered by Dr. A. B. Koteswara Rao on Parallel Robots.

PRACTICAL SESSION



Figure 4: Practical Session Delivered by Dr.K. Varalakshmi

Later, the afternoon session was conducted by Dr.K.Varalakshmi on robot controller operations using a teach pendant. All the participants enthusiastically participated in the training session.

DAY-2, 7TH APRIL 2022:

TECHNICAL SESSION:

On day 2, the sessions started with the topics of “*Robot structures, sensors and actuators*”, briefly discussed by **Dr. Sanjay Darvekar** as a resource person. He briefly explained the importance of an industrial robot's bare skeleton, made of robotic arms and a combination of links and joints.



Figure 5: Session on Robotic structures by Dr. Sanjay Darvekar

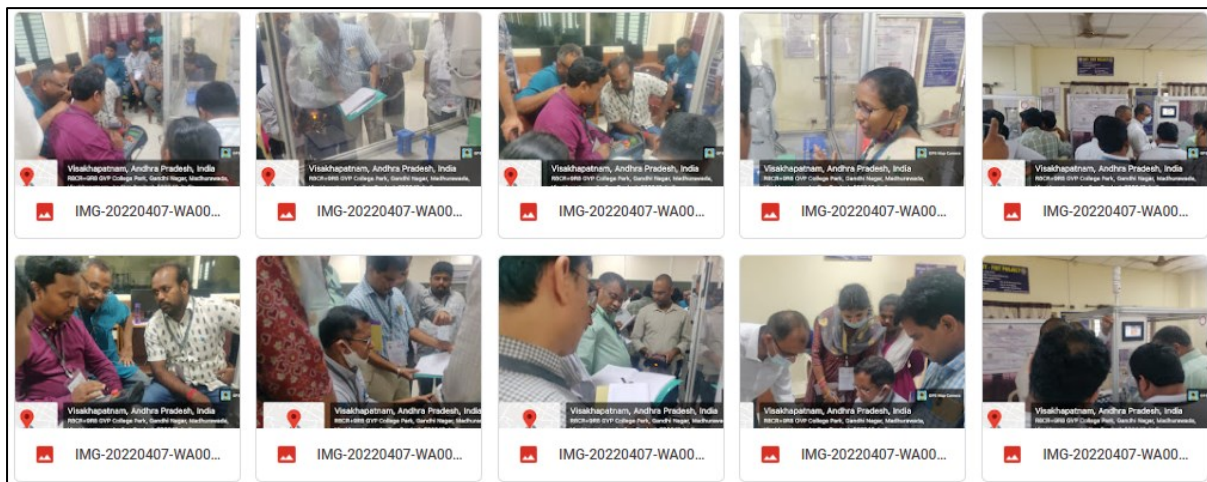


Figure 6: Hands-on training on the use of teaching pendant to the participants by Dr. K. Varalakshmi

PRACTICAL SESSION

The hands-on practical sessions were conducted in the afternoon after lunch, where the participants were allowed to learn and operate the robotic teach pendant practically. The resource persons gave expert hands-on practical training sessions, and the participants could operate the robots using teach pendants at the end of the day.

DAY-3, 8TH APRIL 2022:

TECHNICAL SESSION:

On day 3, the expert and resource person **Dr. M. Amrita**, delivered the session on ***“Preparation and applications of nanoparticles as Nanofluids and self-lubricants while machining”***. She discussed how various preparation methods of nanoparticles had developed and how they are suitable for synthesising nanoparticles in different sizes and shapes.



Figure 7: Technical Session Delivered by Dr. M. Amrita

PRACTICAL SESSION

Later in the afternoon session, the practical hands-on sessions were conducted for the participants on Ultrasonic welding metal and plastic welding machines. The participants were given hands-on training on operating the machine. She discussed that it was primarily included in plastic welding processes.



Figure 8: Practical Session on Ultrasonic Welding Metal and Plastic Welding Machine
DAY-4, 9TH APRIL 2022:

TECHNICAL SESSION:

On day 4, the expert and resource person **Dr. S. Ramakrishna** delivered the topic on **“Vibration based condition monitoring of machines and structures”**. He also said Vibration-based condition monitoring (VCM) is a well-accepted approach in industries for early detection of any defect, triggering the maintenance process and ultimately reducing plant downtime.



Figure 9: Session delivered by Dr. S. Ramakrishna

PRACTICAL SESSION

The afternoon sessions carried on training the participants on programming, and the participants were able to write the programs related to robotic programming. The session ended with hands-on programming with a robot miniature.



Figure 10: Practical Session on day 4

DAY-5, 10TH APRIL 2022:

TECHNICAL SESSION:



Figure 11: Session Delivered by Dr. M. Mohan Jagadeesh Kumar

On day 4, the expert and resource person **Dr. M. Mohan Jagadeesh Kumar** delivered about “*Experimental analysis on solar air heater and its performance evaluation*”. He discussed that solar air heating is a renewable energy technology used to heat or condition air for buildings or process heat applications.

PRACTICAL SESSION:

Later in the afternoon, a demonstration of the solar air heater's mechanism was held. The training also demonstrated that a solar air heater is advantageous because it uses sunlight to generate energy instead of using other fuel sources or natural gas. At the end of the session, the participants could learn the live advantages of the solar air heater.



Figure 12: Training and practical session on Solar Air Heater

DAY-6, 11TH APRIL 2022:

TECHNICAL SESSION:

On day 6, the expert and resource person, **Dr. D. Srinivasa Rao**, delivered on “*Shape Memory Alloys*”. He explained that Shape-memory alloys are metals that, even if they become deformed below a given temperature, return to their original shape before deformation simply by being heated.



Figure 13: Technical session by D.Srinivasa Rao on Shape Memory Alloys

PRACTICAL SESSION:

The afternoon sessions were demonstrated on the *bottom pouring casting machine*. This machine uses a bottom pouring mechanism to transfer metal from a crucible to the mould. Participants in the training session could operate and use this machine at the end of the training session.



Figure 14: Practical session on bottom pouring casting machine

DAY-7, 12TH APRIL 2022:

TECHNICAL SESSION:

On day 7, **Dr. B. Govinda Rao** delivered an expert lecture on the **“Effect of compression ratio and exhaust gas recirculation”**, which he said would lead to better mixing of fuel and increased temperatures during the expansion stroke. He explained that the higher the compression ratio, the longer the expansion cycle, more mechanical power output, and lower exhaust temperatures.



Figure 15: Technical Session delivered by Dr. B. Govinda Rao

PRACTICAL SESSION:

The afternoon session was demonstrated with a hands-on practical session on a **variable compression engine**. The participants understood the compression ratio of an internal combustion engine while the engine was in operation. This is done to increase fuel efficiency while under varying loads.



Figure 16: Practical session on Variable Compression Ratio Engine

On the last day of DST sponsored seven-day training program "Diversified research in Mechanical Engineering," jointly organised by Gayatri Vidya Parishad College of Engineering (A) in collaboration with GITAM (Deemed to be University), a valedictory session was conducted before closing the program, Certificate were distributed to the participants by the head of the department, Mechanical Engineering, GVPCE(A) and STUTI program coordinator Dr. Balla Srinivasa Prasad and congratulated all the participants on completing the seven-day training program.



Figure 17: Certificate distribution to the participants by Dr.Balla Srinivasa Prasad, STUTI coordinator. GIT, GITAM, Visakhapatnam



Figure 18: Final day participants with STUTI program coordinator of Hub (GITAM) and Spoke (GVPCE) institutes

VOTE OF THANKS

They thanked Dr. A. B. Koteswara Rao for appearing and speaking to participants about careers. Our guests are grateful to Prof. Vijaysekhar Chellaboina, Dean of Engineering at GITAM Deemed to be University, for sharing career advice and ethically motivating students. Dr. Balla Srinivas Prasad and Dr. K.Suresh Kumar, the team coordinators, and all the staff, volunteers, and students who made this event successful are thanked. Prof. B. Srinivas Prasad STUTI programme coordinator, closed the event. The program ended with a national anthem.

Regards,
Dr Balla Srinivasa Prasad
STUTI program coordinator (DST/RND/STUTI/2021/18)
GITAM Institute of Technology, GITAM Deemed to be University
Visakhapatnam-530045 (Email: sballa@gitam.edu/ Cell: **9848321070**)