A Report on
Six-days Skill Development and Training on
"MATLAB Programming in Electrical & Electronics Engineering"
Organized by Department of Electrical & Electronics Engineering
in association with Skill Development Cell (SDC)
From 25.11.2024 to 30.11.2024

Event Organised by: Dr. V. B. Thurai Raaj, Assistant Professor, Department of EEE & SPOC-APSSDC Coordinator; Mr. B. Karthick, Assistant Professor, Department of EEE; Dr. Vineet Kumar, Assistant Professor, EEE.

Chief Guest: Dr. A.V. Pavan Kumar, Professor and Head, Department of EEE, MITS.

Attendees: 35 members

Venue: WB220 (Simulation Lab)

Report Received on 02.12.2024.

Mode of Conduct: Offline.

Background:

The **6 Days Skill Development and Training on MATLAB Programming in Electrical & Electronics Engineering** was organized by the Department of Electrical & Electronics Engineering (EEE) in collaboration with the **Skill Development Cell (SDC)** at Madanapalle Institute of Technology & Science (MITS). The program aimed to provide 2nd- year EEE students with hands-on training and in-depth knowledge of MATLAB and Simulink for solving real-world engineering problems. Recognizing the importance of simulation and modeling in modern electrical engineering, the event focused on applications in renewable energy systems, electric vehicles, power systems, and microgrid technologies. The sessions were conducted by internal faculty members who are experts in their respective fields, ensuring a high-quality and impactful learning experience.

PROGRAM SCHEDULE

S: No	Day	Name of the Faculty	Topics Covered
1	25.11.2024	Dr. K. Lakshmi Khandan & Dr. Vineet Kumar	Recent Trends in Power Electronics in Renewable Energy Systems
2	26.11.2024	Dr. Srinivas Chikkam & Dr. Grande Naga Jyothi	Electric Vehicle Modelling & Simulation Techniques
3	27.11.2024	Mr. Ibrahim Zafar	Familiarization with Applied Electronics & Components
4	28.11.2024	Dr. Nehru Kandasamy	Recent Developments in Microgrid Technologies
5	29.11.2024	Dr. Satish Kumar Ramoji	Recent Methodologies in the Field of Power System & Control
6	30.11.2024	Dr. V.B. Thurai Raaj	Challenges and Recent Advancements in Modern Power Systems

Resource Person Details:

The resource persons for the 6 Days Skill Development and Training on MATLAB Programming in Electrical & Electronics Engineering were esteemed faculty members from the Department of Electrical & Electronics Engineering at MITS, all serving as Assistant Professors with expertise in diverse domains. Dr. K. Lakshmi Khandan and Dr. Vineet Kumar initiated the program with sessions on renewable energy systems and power electronics. Dr. Srinivas Chikkam and Dr. Grande Naga Jyothi provided valuable insights into electric vehicle modeling and simulation techniques. Mr. Ibrahim Zafar enriched the participants' understanding of applied electronics and system design. Dr. Nehru Kandasamy offered advanced training in microgrid technologies, while Dr. Sathish Kumar Ramoji shared methodologies for power system and control simulations. Finally, Dr. V.B. Thurai Raaj concluded the program with sessions on modern power system advancements, including renewable integration and AI-based fault detection. Their collective expertise ensured a comprehensive learning experience for all participants.

Detailed Summary of the Event:

Day 1: 25th November 2024
The program began with sessions on **Recent Trends in Power Electronics in Renewable Energy Systems**. Dr. K. Lakshmi Khandan and Dr. Vineet Kumar introduced participants to the basics of modeling and simulation of photovoltaic systems using Maximum Power Point Tracking (MPPT) algorithms. The hands-on exercises focused on designing DC- DC converters such as boost and buck types using MATLAB/Simulink. Students also explored grid-tied inverter simulations for renewable energy integration, fault analysis in renewable systems, and the dynamic modeling of hybrid systems combining wind and solar resources.

Day 2: 26th November 2024
Focusing on **Electric Vehicle Modeling & Simulation Techniques**, Dr. Srinivas Chikkam and Dr. Grande Naga Jyothi provided an in-depth understanding of electric vehicle (EV) powertrain simulations. Participants built and tested EV models, including batteries, motors, and converters, using MATLAB/Simulink. The sessions also highlighted thermal analysis techniques for EV batteries and the use of MATLAB toolboxes for estimating battery state-of-charge (SOC) and state-of-health (SOH). Additionally, EV charging station modeling and power flow analysis were explored.

Day 3: 27th November 2024
The third day shifted focus to **Applied Electronics and Components** under the guidance of Mr. Ibrahim Zafar. Students simulated basic electronic circuits such as amplifiers and filters using Simulink. They learned microcontroller-based system design and modelled sensor responses for data acquisition. The sessions also emphasized signal processing for sensor data and simulation of embedded system designs using Simulink and State flow, equipping participants with a foundational understanding of electronics in system modeling.

Day 4: 28th November 2024
On the fourth day, Dr. Nehru Kandasamy conducted sessions on **Recent Developments in Microgrid Technologies**. The sessions covered microgrid design and simulation, with an emphasis on real-time power flow analysis and load sharing between isolated and grid-connected microgrids. Energy storage system integration and stability analysis in microgrids were discussed, along with fault detection and protection algorithms. These exercises provided students with a deeper understanding of how to address challenges in modern microgrid systems.

Day 5: 29th November 2024

The fifth day highlighted **Recent Methodologies in Power System & Control**, led by Dr. Sathish Kumar Ramoji. Students engaged in simulations of power system stability studies and load forecasting using MATLAB's Machine Learning Toolbox. The sessions introduced the modeling and control of Flexible AC Transmission Systems (FACTS) devices, smart grid simulations focusing on demand response, and advanced power flow analysis techniques for modern grid infrastructures.

Day 6: 30th November 2024

The final day addressed **Challenges and Recent Advancements in Modern Power Systems**, with Dr. V.B. Thurai Raaj as the resource person. The sessions included dynamic modeling of renewable energy integration in high-penetration scenarios and simulations of High Voltage Direct Current (HVDC) transmission systems. Participants also explored the application of artificial intelligence for fault detection using MATLAB's AI toolbox. The event concluded with discussions on real-time grid monitoring systems and modeling smart grids with distributed energy resources.

A heartfelt vote of thanks is extended to the MITS management, including our Chief Patron, Dr. N. Vijaya Bhaskar Choudary, and Patron, Mrs. Keerthi Nadella, for their unwavering support in organizing this event. Special gratitude goes to our Principal, Dr. C. Yuvaraj, for his guidance and encouragement, and to Dr. A.V. Pavan Kumar, HOD of EEE, for his proactive involvement in ensuring the smooth execution of the program. The dedication and expertise of our resource persons—Dr. K. Lakshmi Khandan, Dr. Vineet Kumar, Dr. Srinivas Chikkam, Dr. Grande Naga Jyothi, Mr. Ibrahim Zafar, Dr. Nehru Kandasamy, Dr. R. Saravana Kumar, and Dr. V.B. Thurai Raaj—deserve special acknowledgment for delivering enriching sessions. Lastly, a note of appreciation goes to the participating students for their active engagement, which contributed significantly to the program's success.

Outcome of Event:

- **Enhanced MATLAB Skills:** Participants developed advanced programming skills in MATLAB, with a focus on practical applications in electrical and electronics engineering.
- **Hands-On Simulation Experience:** Students gained valuable experience in simulating systems such as renewable energy integrations, electric vehicles, power systems, and microgrids using MATLAB/Simulink.
- **Exposure to Advanced Topics:** The program introduced cutting-edge topics like AI applications in fault detection, HVDC system simulations, and smart grid modeling, providing a futuristic perspective on engineering challenges.
- **Interdisciplinary Learning:** Participants explored the integration of electronics, control systems, and power systems with MATLAB toolboxes, enhancing their interdisciplinary knowledge.
- **Improved Problem-Solving Skills:** The event equipped students with the ability to model, simulate, and analyze complex systems, preparing them for industry challenges and higher studies.

Feedback Analysis: