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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India
DEPARTMENT OF ELECTRONICS& COMMUNICATION ENGINEERING

Report on one-week Hands-On Training Program on "ADVANCED EMBEDDED SYSTEM APPLICATION IOT PROGRAMMING"

Event Type	:	Workshop
Date / Duration	:	21st September 2026 to 26th September 2026
Resource Person	:	Mr. M. Marimuthu, Syed Jamalulla Basha, Amuthu Swaminathan, TARAS Systems and Solutions
Name of Coordinator(s)	:	Dr .B. Rambabu, Dr. P. Venkat Rao
Target Audience	:	V Semester B. Tech Students
Total no of Participants	:	V Semester B. Tech Students- 66 Nos.
Objective of the event	:	It provides platform to enhance the skills towards Design Strategies for Applications & Challenges in Advanced Embedded systems.
Outcome of event	:	The Embedded system training program provided participants with practical knowledge of Tinkercad, Arduino, Embedded C and STM32 and IoT through theory and hands-on exercises.

Sustainable Development Goals (SDGs) Addressed:

To support the objectives of the Sustainable Development Goals (SDGs), a One-Week Hands-On Training Program on "Embedded Systems Design and IoT Programming" was organized for V Semester B.Tech. ECE students.

The following three Sustainable Development Goals are directly addressed by the training program.

SDG 4 – Quality Education

The training program contributed to quality education by providing students with practical and industry-oriented learning in embedded systems and IoT programming. The participants gained knowledge of embedded system fundamentals, Arduino programming, Embedded C, microcontrollers, peripheral interfacing, communication protocols, and IoT applications. Hands-on exercises and practical demonstrations helped students strengthen their technical knowledge, programming skills, and problem-solving abilities.

SDG 8 – Decent Work and Economic Growth

The program supported students' career readiness by developing technical skills relevant to the embedded systems, electronics, and IoT industries. Practical sessions on Arduino, microcontroller programming, sensor interfacing, device communication, and IoT application development helped students improve their technical competency. These activities enhanced their employability and prepared them for future professional opportunities.

SDG 9 – Industry, Innovation and Infrastructure

The training promoted technological learning and innovation through practical exposure to embedded systems, microcontrollers, electronic circuit simulation, and IoT applications. Students learned to develop and simulate electronic circuits using Tinkercad, program Arduino boards, configure microcontroller peripherals, interface sensors and actuators, and explore communication between embedded devices. These activities encouraged innovative thinking and the development of practical solutions for modern electronic and smart-system applications.

Description / Report on the Event:

The One-Week Hands-On Training Program on "Embedded Systems Design and IoT Programming" was organized for V Semester B.Tech. ECE students to provide practical knowledge and hands-on experience in embedded systems, programming, microcontroller development, peripheral interfacing, communication protocols, and Internet of Things (IoT) applications.

The program aimed to bridge the gap between theoretical knowledge and practical implementation by introducing students to electronic circuit simulation, Arduino programming, Embedded C, microcontroller configuration, sensor interfacing, and IoT-based applications.

Inaugural Session:

The training program was inaugurated on 21 September 2026 at 9:00 AM by Dr. G. Srinivasulu, Head of the Department of ECE, in the presence of the program coordinators, Dr. B. Rambabu and Dr. P. Venkat Rao, and the resource person, Mr.M. Marimuthu, Lead Design Engineer, Taras Systems Solutions.

During the inaugural session, Dr. G. Srinivasulu highlighted the importance of embedded systems and IoT technologies in modern electronics and communication engineering. He emphasized that students should continuously update their technical knowledge in emerging technologies and strengthen their core engineering skills to meet current industry requirements. He encouraged students to focus on practical learning and pursue career opportunities aligned with their technical knowledge.

Day 1: Fundamentals of Embedded Systems, Tinkercad, Arduino and Embedded C Programming

The first day focused on the fundamentals of embedded systems and introductory programming concepts. The resource person introduced the participants to embedded systems, their characteristics, applications, and the basic hardware and software components involved in embedded system development. The session highlighted the importance of microcontrollers in applications such as automation, robotics, consumer electronics, and IoT-based systems.

The participants were introduced to Tinkercad, an online simulation platform used to design and simulate basic electronic circuits. They learned about electronic components such as LEDs, resistors, switches, and Arduino boards. Practical demonstrations helped students understand circuit connections and the working principles of electronic components through simulation.

The session also covered the fundamentals of Arduino programming, including the Arduino board, Arduino IDE, program structure, and basic input/output operations. Students were introduced to Embedded C programming concepts such as variables, data types, operators, conditional statements, loops, and functions. Basic programs for controlling LEDs and reading digital inputs were explained through examples.

Hands-on exercises using Tinkercad and Arduino helped participants understand the relationship between software programming and hardware operation. The session provided a strong foundation for the subsequent sessions on microcontroller programming, peripheral interfacing, sensor integration, and IoT application development.

Day 2: STM32 Programming and Peripheral Configuration

The second day concentrated on STM32 microcontroller programming and peripheral configuration. The participants learned about the STM32 microcontroller family, package variants, internal architecture, pin configuration, memory organization, and bus architecture.

The session covered clock management, oscillator circuits, and hardware design considerations. Students were introduced to embedded development platforms, including Arduino IDE and STM32CubeIDE, and learned about the configuration of microcontroller peripherals.

Hands-on exercises focused on General-Purpose Input/Output (GPIO) programming, port configuration, clock configuration, peripheral initialization, and the development of simple embedded applications using STM32CubeIDE. These practical activities helped students understand how to configure microcontrollers and implement basic embedded applications.

Day 3: Peripheral Interfacing and Interrupt Management

The third day focused on peripheral interfacing and interrupt management in embedded systems. The resource person explained digital input and output interfacing, timer fundamentals, the SysTick timer, general-purpose timers, and Pulse Width Modulation (PWM) generation.

The session also covered Analog-to-Digital Converter (ADC) and Digital-to-Analog Converter (DAC) fundamentals, analog sensor interfacing techniques, and interrupt handling using the Nested Vectored Interrupt Controller (NVIC). Interrupt priorities and event management were discussed with relevant examples.

Practical exercises included configuring GPIO pins as digital inputs and outputs, interfacing seven-segment displays, LCDs, and keypads, and interfacing DC motors, servo motors, stepper motors, and relays. Students also explored ADC-based sensor reading, DAC configuration, and interrupt generation and handling applications.

These activities provided practical exposure to the interaction between microcontrollers and external devices and helped students understand how embedded systems respond to inputs and control connected hardware.

Day 4: Communication Protocols and Real-Time Operating Systems

The fourth day introduced communication protocols used in embedded systems and the fundamentals of Real-Time Operating Systems (RTOS). Students learned about UART communication, initialization, and data transfer between embedded devices.

The session covered Inter-Integrated Circuit (I2C) and Serial Peripheral Interface (SPI) protocols, their configuration, and their applications in communication with peripheral devices. An overview of the Controller Area Network (CAN) protocol was also provided.

The participants were introduced to Embedded Linux, embedded operating systems, RTOS concepts, task scheduling, and RTOS applications. Practical exercises focused on UART communication between two embedded devices, I2C communication with peripheral devices, and SPI communication between controllers.

The session helped students understand the importance of communication interfaces and real-time task management in developing reliable embedded applications.

Day 5: Internet of Things Applications

The fifth day focused on the fundamentals and applications of the Internet of Things. The resource person explained IoT characteristics, functional blocks, communication models, IoT protocols, embedded networking, and IoT system architecture.
The session covered IPv4 and IPv6 concepts, IoT microcontrollers and wireless platforms, cloud connectivity, and the Cloud of Things. Students were introduced to the HTTP protocol and its request and response methods for communication with cloud servers.

Practical exercises focused on uploading sensor data to web applications, monitoring and controlling devices through web interfaces, and uploading data to cloud platforms using HTTP. The participants learned how embedded devices can collect data and communicate with remote applications for monitoring and control.

These activities helped students understand the integration of embedded hardware, networking, and cloud services in IoT-based applications.

Day 6: Practical Demonstration, Assessment and Evaluation

The sixth day was dedicated to practical implementation, project demonstration, and assessment of the concepts covered during the training program. The participants reviewed embedded C programming, Arduino fundamentals, STM32 peripheral configuration, sensor interfacing, communication protocols, and IoT application development.

A demonstration project was presented to provide practical exposure to the application of embedded systems and IoT concepts. The participants were encouraged to apply their knowledge to practical engineering problems through systematic circuit design, programming, interfacing, and testing.

The program concluded with practical exercises, an interview-oriented question-and-answer session, assessment and evaluation, and the distribution of training materials. These activities helped assess the participants' understanding and reinforce the technical skills acquired during the training.

Valedictory Session

The valedictory session of the One-Week Hands-On Training Program was held on 26 September 2026 at 3:40 PM in the presence of Dr. G. Srinivasulu, the program coordinators, Dr. B. Rambabu and Dr. P. Venkat Rao, and the student participants.

During the valedictory session, Dr. G. Srinivasulu conveyed his best wishes to all the participants and motivated them to continuously learn and upgrade their knowledge in emerging technologies for future career growth and professional development.

The program coordinators expressed their sincere gratitude to the Principal and Management of LBRCE for granting permission and extending their support for the successful organization of the training program. They also conveyed their heartfelt thanks to the resource person for sharing valuable knowledge, time, and expertise with the students.

Special appreciation was expressed to Dr. K. Appa Rao, Principal, LBRCE, and the management for providing continuous support and a conducive learning environment for the successful completion of the program.

Feedback from the Participants

The feedback received from the students was highly positive and encouraging. The participants expressed that the training program enhanced their understanding of embedded systems, Arduino programming, Embedded C, microcontroller configuration, peripheral interfacing, communication protocols, and IoT applications.

They appreciated the practical introduction to Tinkercad and Arduino, which helped them understand electronic circuit connections and the relationship between programming and hardware operation. The subsequent sessions provided additional exposure to microcontroller programming, sensor interfacing, device communication, and cloud-based applications.

The students expressed satisfaction with the practical and industry-oriented content and acknowledged the efforts of the Department of ECE and the program coordinators in organizing the sessions and making the necessary arrangements for the successful conduct of the program.

Certificates were issued to all 66 participants by TARAS Systems and Solutions upon successful completion of the training program.

Conclusion

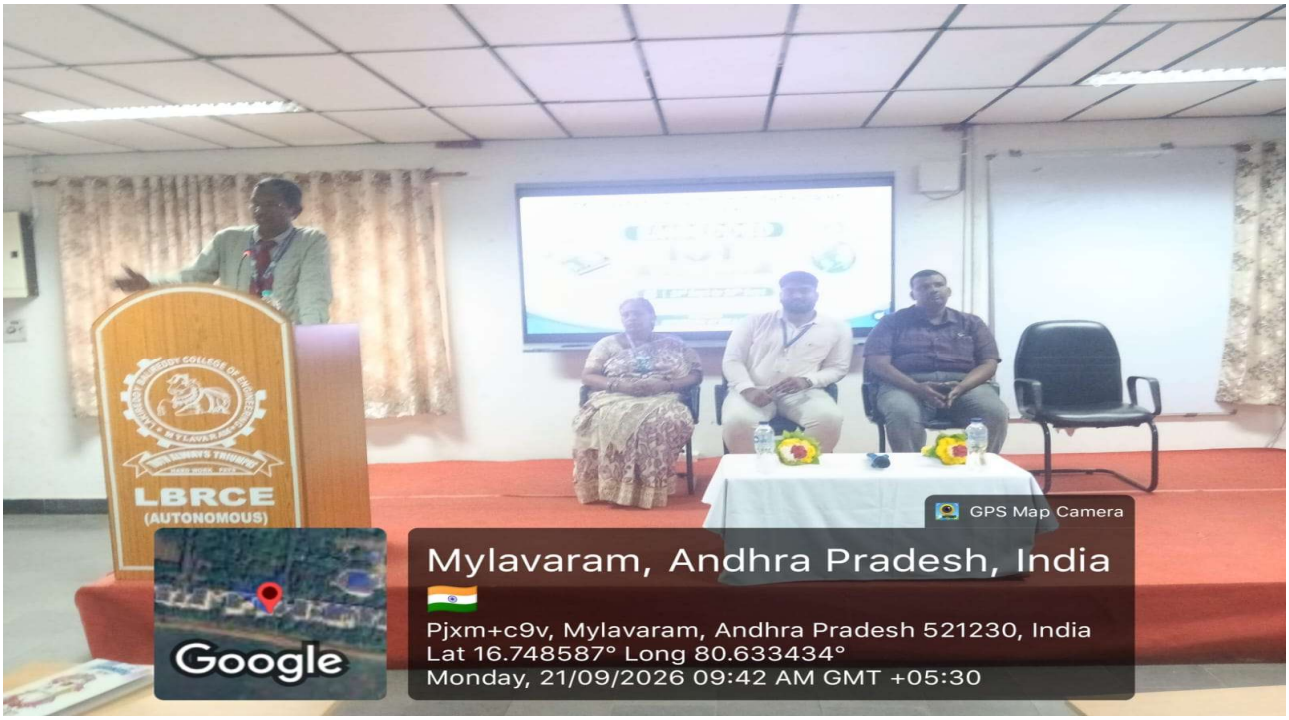
The One-Week Hands-On Training Program on “Embedded Systems Design and IoT Programming” provided students with a structured introduction to embedded system fundamentals, electronic circuit simulation, Arduino programming, Embedded C, microcontroller configuration, peripheral interfacing, communication protocols, and IoT applications.

The program strengthened the participants' practical understanding of embedded technologies and encouraged them to apply their technical knowledge to real-world engineering problems. It also supported their professional development by providing exposure to tools, programming techniques, and technologies relevant to the embedded systems and IoT domains.

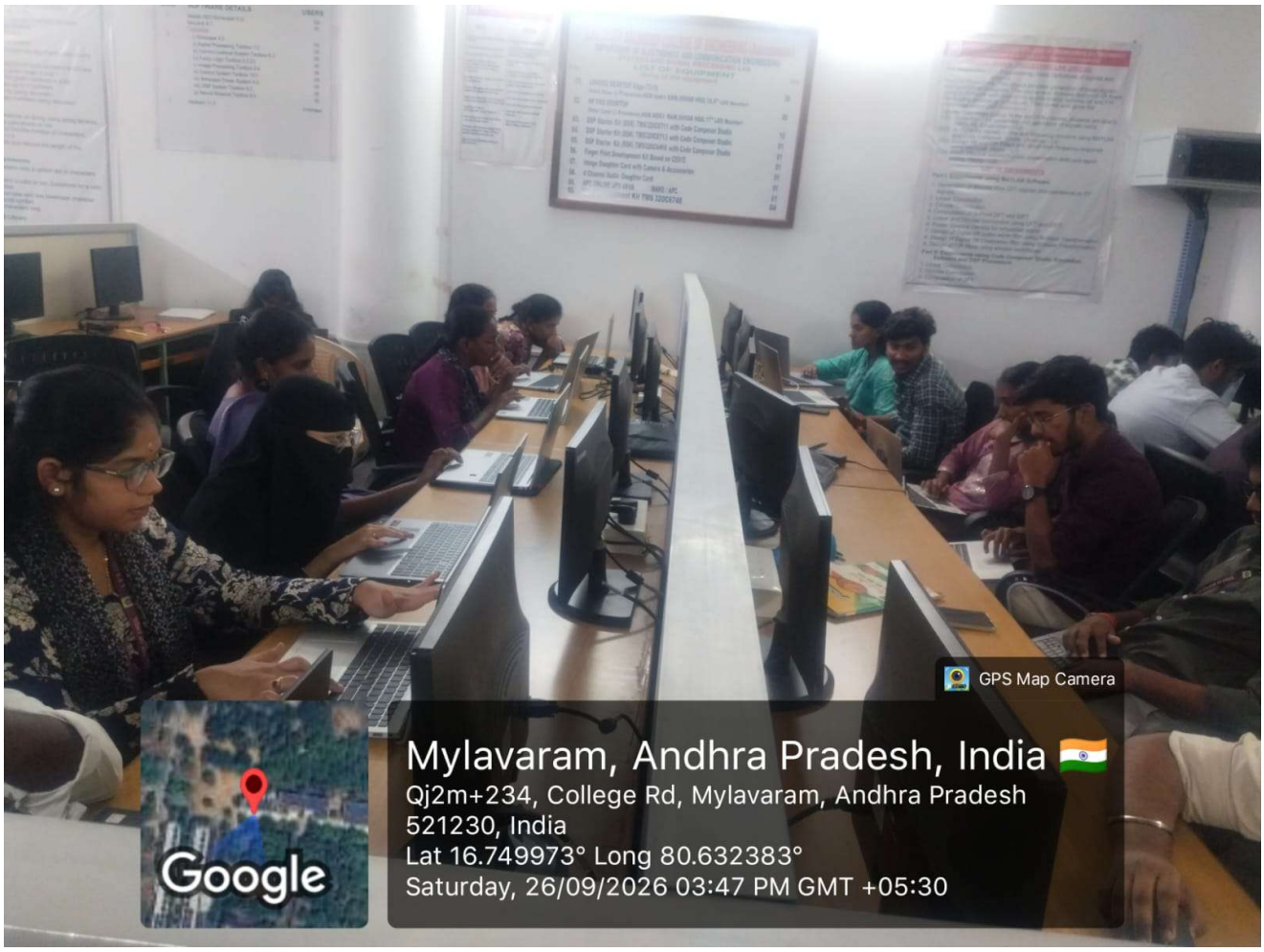
Workshop Banner



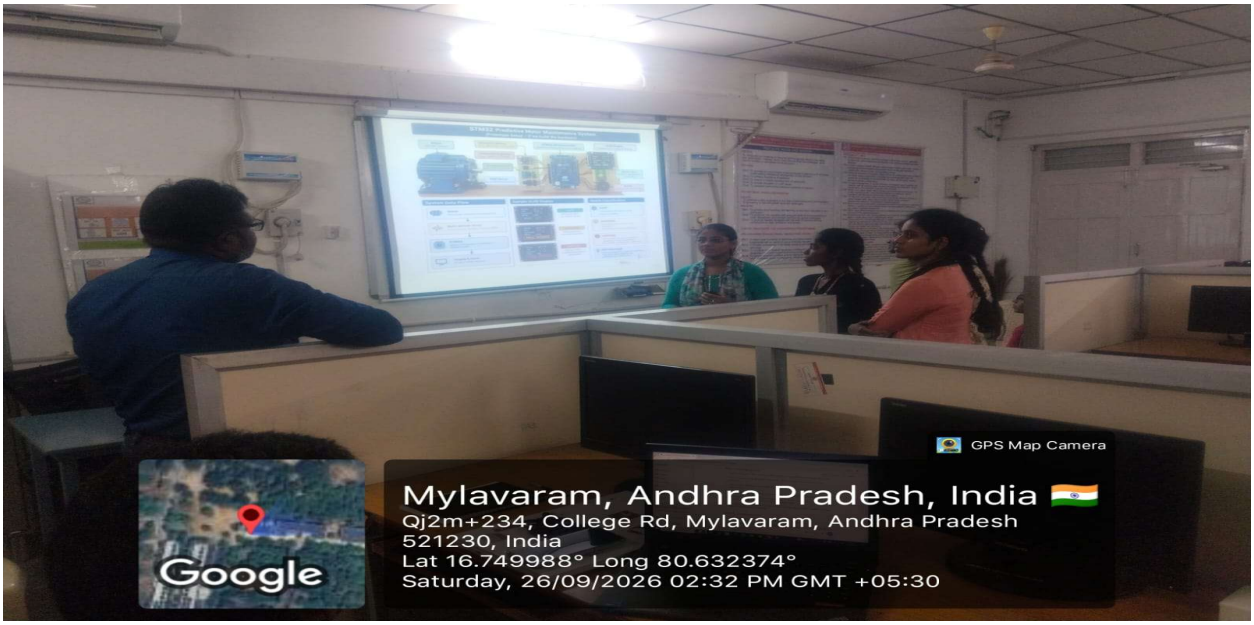
Workshop Photos






GPS Map Camera
Mylavaram, Andhra Pradesh, India
Qj2m+234, College Rd, Mylavaram, Andhra Pradesh 521230, India
Lat 16.749973° Long 80.632383°
Saturday, 26/09/2026 03:47 PM GMT +05:30
Google


GPS Map Camera
Mylavaram, Andhra Pradesh, India
Pjxm+c9v, Mylavaram, Andhra Pradesh 521230, India
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