VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI-18
Dayananda Sagar College of Engineering, Bangalore – 560078
Department of Electronics and Communication
Academic Year: 2022-23

A 1-page synopsis / abstract on

"Real Time Smart Helmet"

(19EC8ICINT) - 2 Credits – 50 Marks

Submitted by

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H O D – Dr. TCM	:		

Map with the " √ "tick mark against appropriate PO and PSO

Justification for PO and PSO mapping for Internship (**19EC8ICINT**)

USN	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1DS19EC725	√	√	√	√	√	√	√	√	√			√	√	√

Title of the Seminar : Real Time Smart Helmet	
PO1	Engineering knowledge of science, coal mining, health safety and electronic circuits.
PO2	The problem analysis needs to control, monitor the workers inside coal mines.
PO3	Use of NodeMCU and different sensors to monitor worker health parameters & temperature, gases inside mines.
PO4	Conducted different experiments in different conditions for proper reading of parameters.
PO5	Used Google Firebase database Cloud and Arduino IDE to publish the data on app
PO6	Providing a sustainable and efficient renewable energy source in various products and surfaces.
PO7	Providing a clean and renewable energy source that reduces carbon emissions, mitigates climate change, and promotes a more sustainable future.
PO8	Promoting a more sustainable future, reducing environmental impact, and improving access to renewable energy sources.
PO9	Achieved through both individual innovation and collaborative teamwork.
PO10	
PO11	
PO12	Required a commitment to lifelong learning by researchers and engineers.
PSO1	The design, development, and integration of electronic circuits and systems using current practices and standards.
PSO2	The model developed involves application of knowledge of hardware in designing embedded and communication systems, which enabled efficient energy harvesting and storage.

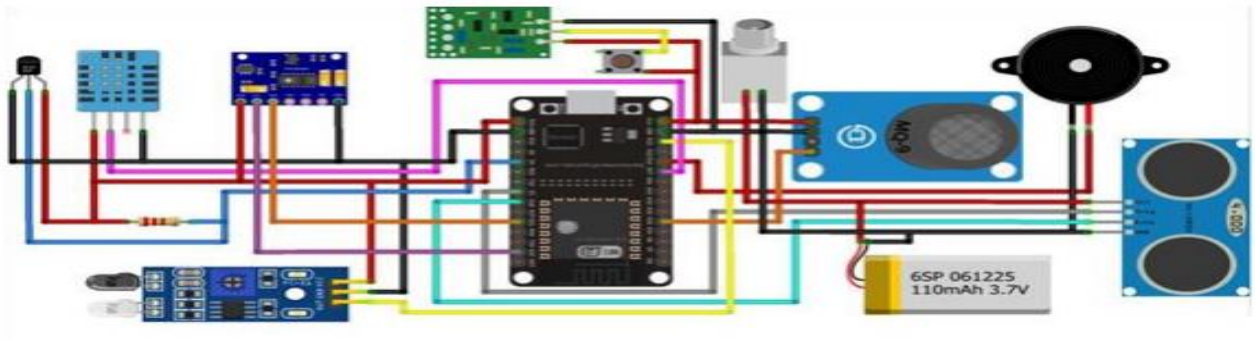
Course Outcomes:
CO1: Acquire Knowledge on the emerging technologies related to electronics and communication engineering
CO2: Able to demonstrate problem solving skills specific to electronics and communication domain
CO3: Gain exposure to industry/organisation work culture, with focus on modern tools/techniques used in industry
CO4: Understand the limitations of the use of current technology
CO5: Able to demonstrate effective management of personal behaviour, ethics and time management towards achieving internship goals contributing as an individual/team member in multidisciplinary environment.
CO6: Demonstrate effective presentation and communication skills, time management and create proper documentation of the work.

Synopsis / Abstract of the Technical Internship

Abstract: During an internship at CELESTIAL V SOLUTIONS, the objective of this project was to design and develop a smart helmet for mining industry applications. The system enables real-time monitoring of hazardous events such as temperature and humidity fluctuations, gas releases, miner's consciousness levels, helmet removal, and potential helmet damage. The project involved programming and troubleshooting for the helmet section and control room section, allowing for data transmission and alerts between the two. Additionally, the system syncs data to the Google Firebase database and incorporates an alert mechanism for monitoring water rise levels to prevent flooding. The integration of various sensors and microprocessors enhances safety and health standards in mining while providing real-time data access for managers and family members.

Introduction: The proposed smart helmet for the mining industry will leverage IoT technologies to monitor hazardous events in real-time, enhancing safety standards. The system will consist of a helmet section with sensors and a transmitter, and a control room section with a receiver for data collection and processing. Alerts will be sent regarding water rise levels, and the collected data will be synced with the Google Firebase Database. Structural changes in mine construction will also be considered to further improve safety and efficiency.

Circuit Diagram:



Objective/Aim:
The aim of the project is to design and develop a smart helmet for mining industry applications that enables real-time monitoring of hazardous conditions, transmission of data and alerts, synchronization with the Google Firebase Database, and implementation of an alert system for water rise detection.

Methodology:
The methodology for designing and developing the Smart Helmet for mining industry applications involves a systematic approach. It begins with a thorough analysis of the requirements and challenges specific to the mining industry. Next, a range of sensors is carefully selected and integrated into the helmet to enable real-time monitoring of hazardous events. The hardware components, including the helmet structure, sensor connections, microcontrollers, and power management system, are developed to ensure durability and suitability for mining environments. The software components are then created to facilitate data collection, processing, and transmission. Real-time data synchronization with the Google Firebase Database and the implementation of an alert system are key steps. Finally, extensive testing and evaluation are conducted to validate the system's performance, followed by continuous optimization and improvement based on feedback received.

Tools used (h/w & s/w): 1. NodeMCU V3 2. DHT11 Sensor Module 3. MQ-9 Gas Sensor Module 4.) UV Sensor 5. Breadboard 6. Connecting Wires 7. AC-DC 8. Thermal Probe 9. Resistors 10. IR Proximity Sensor
SOFTWARE COMPONENTS 1. Google Firebase Database 2. Arduino IDE

Applications: Mining Industry, Construction Industry, Oil & Gas Industry, Manufacturing Industry, Emergency Response & Disaster Management

Advantages: Real-time monitoring of hazardous events in mining environments.
Enhanced safety and improved health monitoring for miners.
Integration with Google Firebase for real-time data synchronization and access.
Alert system for timely notifications and response to critical events.
Potential for scalability and expansion into other industries.

Outcome: The outcome of the project is a smart helmet and clothing system for the mining industry that enables real-time monitoring of hazardous events, including gas release, temperature, humidity, helmet removal, and water rise. It provides timely alerts to ensure the safety of miners and facilitates access to real-time data for efficient decision-making.