



**RVS COLLEGE OF ENGINEERING AND TECHNOLOGY**  
KumaranKottam Campus, Kannampalayam (Po), Coimbatore – 641 402  
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)  
**NAAC Accredited and ISO 21001:2018 certified Institution**



**1.3.2. Name of the Course that include experiential learning through project work/fieldwork/internship:**

<b>S.No</b>	<b>Name of the Course that include experiential learning through project work/field work/internship</b>	<b>Course code</b>	<b>Page No</b>
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**OUTCOMES:**

Upon completion of the course, student should be able to

- Apply the concepts for mixed signal MOS circuit.
- Analyze the characteristics of IC based CMOS filters.
- Design of various data converter architecture circuits.
- Analyze the signal to noise ratio and modeling of mixed signals.
- Design of oscillators and phase lock loop circuit.

**REFERENCES:**

1. CMOS Mixed Signal Circuit Design by R.Jacob Baker, Wiley India, IEEE Press, reprint 2008.
2. CMOS Circuit Design, Layout and Simulation by R.Jacob Baker, Wiley India, IEEE Press, Second Edition, reprint 2009.
3. Design of Analog CMOS Integrated Circuits by Behzad Razavi, McGraw Hill, 33<sup>rd</sup> Reprint, 2016.

GE8071

DISASTER MANAGEMENT

L T P C  
3 0 0 3**OBJECTIVES:**

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

**UNIT I INTRODUCTION TO DISASTERS****9**

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

**UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR)****9**

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processes and Framework at State and Central Level- **State Disaster Management Authority(SDMA)** – Early Warning System – Advisories from Appropriate Agencies.

**UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT****9**

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

**UNIT IV DISASTER RISK MANAGEMENT IN INDIA****9**

Hazard and Vulnerability profile of India, Components of Disaster Relief: **Water, Food, Sanitation, Shelter, Health,** Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes



**INNOVATIVE INTELLIGENT OUTDOOR JACKET FOR  
HEALTH AND SAFETY MONITORING SYSTEM  
USING IOT**

**A PROJECT REPORT**

*Submitted by*

**ARUN MANIKANDAN R (712819106002)**

**JEEVIKA M (712819106006)**

**ARUN KUMAR A (712819106301)**

**KARTHIKA RANI A (712819106901)**

*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

*in*

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**RVS COLLEGE OF ENGINEERING AND TECHNOLOGY**

**COIMBATORE**

**ANNA UNIVERSITY:: CHENNAI 600 025**

**MAY 2023**

ANNA UNIVERSITY :: CHENNAI 600025

**BONAFIDE CERTIFICATE**

Certified that this project "INNOVATIVE INTELLIGENT OUTDOOR JACKET FOR HEALTH AND SAFETY MONITORING SYSTEM USING IOT" is the bonafide work of "ARUN MANIKANDAN R, JEEVIKA M, ARUN KUMAR A, KARTHIKA RANI A" who carried out the project work under my supervision.



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HEAD OF THE DEPARTMENT

PROFESSOR

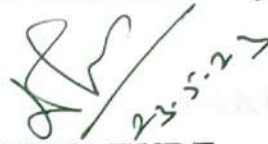
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SUPERVISOR

PROFESSOR

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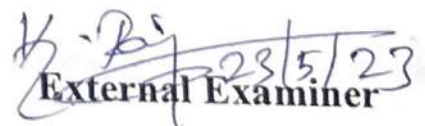
and Technology

Coimbatore-641402.

Submitted for the viva voce examination held on 23.1.05.2023



Internal Examiner



External Examiner



# ABSTRACT

Over the decades, there has been sustained effort to use fashion as a medium for delivering digital functionality. The goal is to integrate information technology (IT) into clothing to provide users with functions to assist them in their tasks. Regarding the direction of previous efforts, developed a multifunctional smart outdoor jacket prototype that senses, recognizes, responds and manages various safety risks and potentially hazardous situations and identifies environmental factors that are difficult to predict the health issue. To determine functions that can practically assist users in outdoor environments and help ensure their health and safety, a user survey subject to expert evaluation was conducted. This project has proposed a system to monitor the health of the wearer by using 12v Battery. DHT 11 sensor is used to sense, Temperature and Humidity. Liquid Crystal Display It displays the values of DHT11. NIR Sensor is used to sense simultaneous function of heart and Blood Pressure. Peltier Crystal works with two basic processes are cool and hot. Motor driver is used to operate the Peltier Crystal. Finally, Blynk App is an IoT application which can pass the updated details through mobile phone to user and their relatives.

## 4.1 HARDWARE DESCRIPTION

### 4.1.1 NODE MCU CONTROLLER

### 4.1.2 THERMISTER

### 4.1.3 MOTORDRIVER

### 4.1.4 LCD DISPLAY

### 4.1.5 BATTERY

18  
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## CHAPTER 6

### CONCLUSION

Clothing has the potential to diversify wearable sensing and HAR functions. Based on this premise, the study investigated the convergence of knowledge and techniques in apparel design and engineering to achieve wearable sensing and HAR system functionality in a clothing platform that monitors users' health and their situation in outdoor environments. The resulting prototype factors in the range of movement of each body part, the electronic components' durability, and a suitable clothing platform during its construction to create a wearable system that interacts with the user's body and an accompanying smartphone app. As a result of this study, a smart outdoor jacket prototype and a smartphone application linked with the prototype's wearable system to provide it with extended functionality were developed. The system provides six functions to assist users in unpredictable outdoor environments, monitor their health status, and efficiently respond to emergencies: Bluetooth hands-free calling, heart rate monitoring, emergency calls, temperature-reactive heating, fall detection and automatic emergency calls, and UV monitoring. The evaluators tested the prototype's wearability and usability, the systems, and the smartphone application through the climbing activity.

**UNIT III POWER OPTIMIZATION OF COMBINATIONAL AND SEQUENTIAL LOGIC MACHINES FOR SOC 9**

Introduction to Standard Cell-Based Layout – Simulation - Combinational Network Delay - Logic and interconnect Design - Power Optimization - Switch Logic Networks. Introduction - Latches and Flip-Flops - Sequential Systems and Clocking Disciplines - Sequential System Design - Power Optimization - Design Validation - Sequential Testing.

**UNIT IV DESIGN OF LOW POWER CIRCUITS FOR SUB SYSTEM ON A SOC 9**

Subsystem Design Principles - Combinational Shifters – Adders – ALUs – Multipliers – High Density Memory – Field Programmable Gate Arrays - Programmable Logic Arrays - Computer arithmetic techniques for low power system – low voltage low power static Random access and dynamic Random access memories, low power clock, Inter connect and layout design

**UNIT V FLOOR PLANNING 9**

Floor-planning Methods – Block Placement & Channel Definition - Global Routing - switchbox Routing - Power Distribution - Clock Distributions - Floor-planning Tips - Design Validation - Off-Chip Connections – Packages, The I/O Architecture - PAD Design

**TOTAL:45 PERIODS**

**OUTCOME:**

**At the end of the course, the student should be able to:**

- Analyze and design low-power VLSI circuits using different circuit technologies for system on chip design

**TEXT BOOKS:**

- J.Rabaey, “Low Power Design Essentials (Integrated Circuits and Systems)”, Springer, 2009
- Wayne Wolf, “Modern VLSI Design – System – on – Chip Design”, Prentice Hall, 3rd Edition, 2008.

**REFERENCES:**

- J.B.Kuo & J.H.Lou, “Low-voltage CMOS VLSI Circuits”, Wiley, 1999.
- A.Bellaowar & M.I.Elmasry, “Low power Digital VLSI Design, Circuits and Systems”, Kluwer, 1996.
- Wayne Wolf, “Modern VLSI Design – IP based Design”, Prentice Hall, 4th Edition, 2008.
- M.J.S. Smith : Application Specific Integrated Circuits, Pearson, 2003
- Sudeep Pasricha and NikilDutt, On-Chip Communication Architectures System on Chip Interconnect, Elsevier, 2008
- Recent literature in Low Power VLSI Circuits.
- Recent literature in Design of ASICs

<b>EC8008</b>	<b>PHOTONIC NETWORKS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES:**

- To enable the student to understand the importance of the backbone infrastructure for our present and future communication needs and familiarize them with the architectures and the protocol stack in use
- To enable the student to understand the differences in the design of data plane and the control plane and the routing, switching and the resource allocation methods and the network management and protection methods in vogue
- To expose the student to the advances in networking and switching domains and the future trends



**UNIT I OPTICAL SYSTEM COMPONENTS 9**

Light Propagation in optical fibers – Loss & bandwidth, System limitations, Nonlinear effects; Solitons; Optical Network Components – Couplers, Isolators & Circulators, Multiplexers & Filters, Optical Amplifiers, Switches, Wavelength Converters.

**UNIT II OPTICAL NETWORK ARCHITECTURES 9**

Introduction to Optical Networks; SONET / SDH, Metropolitan-Area Networks, Layered Architecture; Broadcast and Select Networks – Topologies for Broadcast Networks, Media-Access Control Protocols, Wavelength Routing Architecture.

**UNIT III WAVELENGTH ROUTING NETWORKS 9**

The optical layer, Optical Network Nodes, Routing and wavelength assignment, Traffic Grooming in Optical Networks, Architectural variations- Linear Light wave networks, Logically Routed Networks.

**UNIT IV PACKET SWITCHING AND ACCESS NETWORKS 9**

Photonic Packet Switching – OTDM, Multiplexing and Demultiplexing, Synchronization, Broadcast OTDM networks, Switch-based networks, Contention Resolution Access Networks – Network Architecture overview, Optical Access Network Architectures and OTDM networks.

**UNIT V NETWORK DESIGN AND MANAGEMENT 9**

Transmission System Engineering – System model, Power penalty - transmitter, receiver, Optical amplifiers, crosstalk, dispersion, Wavelength stabilization, Overall design considerations, Control and Management – Network management functions, Configuration management, Performance management, Fault management, Optical safety, Service interface.

**TOTAL:45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student would be able to:**

- Use the backbone infrastructure for our present and future communication needs
- Analyze the architectures and the protocol stack
- Compare the differences in the design of data plane, control plane, routing, switching, resource allocation methods, network management and protection methods in vogue

**REFERENCES:**

1. Rajiv Ramaswami and Kumar N. Sivarajan, "Optical Networks: A Practical Perspective", Harcourt Asia Pte Ltd., Second Edition 2004.
2. C. Siva Ram Moorthy and Mohan Gurusamy, "WDM Optical Networks: Concept, Design and Algorithms", Prentice Hall of India, 1st Edition, 2002.
3. P.E. Green, Jr., "Fiber Optic Networks", Prentice Hall, NJ, 1993.
4. Biswanath Mukherjee, "Optical WDM Networks", Springer Series, 2006.

**EC8009**

**COMPRESSIVE SENSING**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES:**

- To present the basic theory and ideas showing when it is possible to reconstruct sparse or nearly sparse signals from undersampled data
- To expose students to recent ideas in modern convex optimization allowing rapid signal recovery
- To give students a sense of real time applications that might benefit from compressive sensing ideas

**SMART VLC DESIGN LIGHTNING AND  
COMMUNICATION FOR VISIBLE LIGHT  
NETWORKS**

**A PROJECT REPORT**

*Submitted by*

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**KAMALESH R                                712819106007**

**SENTHIL KUMAR M                        712819106013**

**SITHARTHAN V                              712819106015**

*In partial fulfillment for the award of the*

*degree of*

**BACHELOR OF ENGINEERING**

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**ELECTRONICS AND COMMUNICATION ENGINEERING**

**RVS COLLEGE OF ENGINEERING AND  
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**ANNA UNIVERSITY: CHENNAI 600 025**

**MAY 2023**

*23/5/23*  
**EXTERNAL EXAMINER**

# ANNA UNIVERSITY: CHENNAI 600

## 025BONAFIDE CERTIFICATE

Certified that this project report "SMART VLC DESIGN LIGHTNING AND COMMUNICATION FOR VISIBLE LIGHT NETWORKS" is the Bonafede work of "ANTONY VITHURSON R, KAMALESH R, SENTHIL KUMAR M, SITHARTHAN V" who carried out the project work under my supervision.



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INTERNAL EXAMINER



EXTERNAL EXAMINER



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## ABSTRACT

CHAPTER

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The world has witnessed ideas which practically changed the way one lived on the basis of everyday technology. The interconnection between the things and making and making the system smart is one of them. Vehicles connected to the LiFi could be a level up in this game. This technology is known as Visible Light Communication (VLC) which removes the complexity of cable communication. LiFi has evolved over the past years and has been proven to be secure, efficient and can send data at very high rates. This paper showcases a new idea of a vehicle to vehicle (v2v) connection using the light, adding to the existing IOT connected vehicles solution. Vehicle-to-vehicle (V2V) communication's ability to wirelessly exchange information about the speed and position of surrounding vehicles shows great promise in helping to avoid crashes, ease traffic congestion, and improve the environment. But the greatest benefits can only be achieved when all vehicles can communicate with each other. This system could ensure data transfers between to vehicles as they come in range hereby sharing real time road information as well as ensuring a safer and better driving condition for everyone. Communication through LiFi has been developed.

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## CHAPTER 6

### CONCLUSION AND FUTURE

#### SCOPE

##### 6.1 CONCLUSION

This system uses Li-Fi technology which includes many sensors such as MQ3, vibration sensor, ultrasonic sensor, and PC camera along with an Arduino board, LED light and a solar panel to communicate from one vehicle to another. This system proposes a solution to minimize road accidents, and in the future, it can ensure safety to the drivers along with co-passengers by integrating this system everywhere. Li-Fi is introduced as a communication system with its modulation techniques and complete architecture explained. The challenges and advantages of Li-Fi are outlined with its purpose to provide high speed data transmission being one of its biggest pros. The transmission of data from one vehicle to another is done in a very easier by Li-Fi technology by using led light. This technology helps in preventing road accidents.

##### 6.2 FUTURE SCOPE

In the future, it can ensure safety to the drivers along with co-passengers by integrating this system everywhere. The v2v communication system could potentially allow vehicles to collaborate on the roadway by moving closer together in a platoon with other vehicles traveling in the same direction.





<b>UNIT II</b>	<b>SPACE SEGMENT</b>	<b>9</b>
Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command-Transponders-The Antenna Subsystem.		
<b>UNIT III</b>	<b>SATELLITE LINK DESIGN</b>	<b>9</b>
Basic link analysis, Interference analysis, Rain induced attenuation and interference, Ionospheric characteristics, Link Design with and without frequency reuse.		
<b>UNIT IV</b>	<b>SATELLITE ACCESS AND CODING METHODS</b>	<b>9</b>
Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Broadcast, multiple access: FDMA, TDMA, CDMA, DAMA Assignment Methods, compression – encryption, Coding Schemes.		
<b>UNIT V</b>	<b>SATELLITE APPLICATIONS</b>	<b>9</b>
INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. GPS Position Location Principles, Differential GPS, Direct Broadcast satellites (DBS/DTH).		
		<b>TOTAL:45 PERIODS</b>

**OUTCOMES:**

**At the end of the course, the student would be able to:**

- Analyze the satellite orbits
- Analyze the earth segment and space segment
- Analyze the satellite Link design
- Design various satellite applications

**TEXT BOOKS:**

1. Dennis Roddy, "Satellite Communication", 4th Edition, Mc Graw Hill International, 2006.
2. Timothy,Pratt,Charles,W.Bostain,JeremyE.Allnutt,"SatelliteCommunication",2<sup>nd</sup> Edition, Wiley Publications,2002

**REFERENCES:**

1. Wilbur L.Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, "Satellite Communication Systems Engineering", Prentice Hall/Pearson, 2007.
2. N.Agarwal, "Design of Geosynchronous Space Craft", Prentice Hall, 1986.
3. Bruce R. Elbert, "The Satellite Communication Applications", Hand Book, Artech House Boston London, 1997.
4. Tri T. Ha, "Digital Satellite Communication", II nd edition, 1990.
5. Emanuel Fthenakis, "Manual of Satellite Communications", Mc Graw Hill Book Co., 1984.
6. Robert G. Winch, "Telecommunication Trans Mission Systems", Mc Graw-Hill Book Co., 1983.
7. Brian Ackroyd, "World Satellite Communication and earth station Design", BSP professional Books, 1990.
8. G.B.Bleazard, "Introducing Satellite communications", NCC Publication, 1985.
9. M.Richharia, "Satellite Communication Systems-Design Principles", Macmillan 2003.

**SOLAR POWER BASED  
E-VEHICLE CHARGING SYSTEM**

**A PROJECT REPORT**

*Submitted by*

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**LOKKESH.B (712819106008)**

**VIJAYAN.R (712819106017)**

**BOOPATHI.D (712819106705)**

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**MAY 2023**

ACKNOWLEDGEMENT

ANNA UNIVERSITY: CHENNAI 600025

BONAFIDE CERTIFICATE

Certified that this project report "SOLAR POWER BASED E-VEHICLE CHARGING SYSTEM" is the bonafided work of "DURAI PANDI.R, LOKKESH.B, VIJAYAN.R, BOOPATHI.D" who carried out the project work under my supervision.

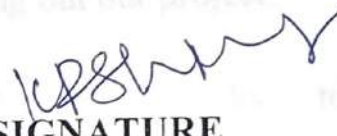


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INTERNAL EXAMINER



EXTERNAL EXAMINER



## CONTENTS

### ABSTRACT

The vehicle population is increasing day by day and is expected to exceed the human population in the upcoming years. This would also result in the consumption of fossil fuels and in the extinction of the non-renewable resources. Hybrid and electric vehicles are gaining popularity, making the improvement in charging station infrastructure a necessity. Superchargers and mega-chargers have set a benchmark for fast charging of high-capacity vehicle batteries. Commercial charging stations are available but only at places with high EV expectancy regions. India's mobility mantra of "Shared, connected and Electric" with 100% EV by 2030 seems to be quite ambitious, but with increased awareness among the consumers and aiding government policies, this goal can be achieved. Ministry of power and Dept. of Heavy Industry Ministry has invited proposals with a target of 1000 EVCS and Tata power has proposed to build around 500 EVCS by 2020. In mega-cities, multi-level parking stations, malls, multiplexes are available with large parking capacity for vehicles. These places are most likely to be parked with EVs in upcoming days and automated parking and charging stations can be implemented there with the proper infrastructure to support their charging. Even rooftop can be utilized to install solar generation plants of suitable capacity to ensure dc fast charging. India receives around 5000 trillion kWh per year energy with an average of 4-7 kWh sq. per day. A grid connected solar enabled automated charging station will simplify the charging of autonomous vehicles. The driverless cars will function as pickup cars taking the user to the desired destination with additional features such as carpooling. A rooftop solar installation for domestic purpose can be utilized for charging EVs and can also serve as commercial stations.

4.1.1 Architecture

4.1.2 Power

4.1.3 Dimension drawing

4.1.4 Solar Panel



## CONCLUSION AND FUTURE SCOPE

## 6.1 CONCLUSION

Due to the development of the charging stations this effect was also neglected hence the charging station is very efficient. They should be placed in larger cities where there is a concentrated population of EV drivers so stations can also be used by local residents. The planning for fast charging stations should be coordinated at the State level and attempt to align with regular routes for government or private fleets of EVs. Electric vehicle smart charging station which is the promising alternative and environmentally sustainable solution to meet up the energy crisis.

To reduce pollution, a battery powered electric vehicle that uses solar array to recharge will be the promising alternative to the existing system. Combining the organic solar cells with electric vehicles and developing Renewable Charging Stations at places will improve the overall efficiency. And moreover this will act as a widespread promotion for clean energy at a global level.

In this paper, a new recharging mechanism for electric vehicles is proposed using solar and wind energy. The usage of EV is directly affected by the present charging technique. Recharging stations are necessary for longer drive vehicles and it is commonly used in few countries. The traveling distance depends on the capacity of energy storage present in the vehicle. The recharging stations are needed for long distance travel. In this paper, we have introduced a new hybrid renewable charging mechanism for EVs. The solar and wind energy has been used for electric vehicle charging. At last, we conclude that this approach reduces the pollution and increases the usage of EVs as a result creating pollution free environment.

**OBJECTIVES:**

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

**UNIT I DIGITAL IMAGE FUNDAMENTALS 9**

Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.

**UNIT II IMAGE ENHANCEMENT 9**

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters, Homomorphic filtering, Color image enhancement.

**UNIT III IMAGE RESTORATION 9**

Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering

**UNIT IV IMAGE SEGMENTATION 9**

Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

**UNIT V IMAGE COMPRESSION AND RECOGNITION 9**

Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

**TOTAL :45 PERIODS****OUTCOMES:**

**At the end of the course, the students should be able to:**

- Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.
- Operate on images using the techniques of smoothing, sharpening and enhancement.
- Understand the restoration concepts and filtering techniques.
- Learn the basics of segmentation, features extraction, compression and recognition methods for color models.

**TEXT BOOKS:**

1. Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing', Pearson, Third Edition, 2010.
2. Anil K. Jain, 'Fundamentals of Digital Image Processing', Pearson, 2002.

**REFERENCES**

1. Kenneth R. Castleman, 'Digital Image Processing', Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, 'Digital Image Processing using MATLAB', Pearson Education, Inc., 2011.
3. D,E. Dudgeon and RM. Mersereau, 'Multidimensional Digital Signal Processing', Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, 'Digital Image Processing', John Wiley, New York, 2002
5. Milan Sonka et al 'Image processing, analysis and machine vision', Brookes/Cole, Vikas Publishing House, 2nd edition, 1999.

**GE8076****PROFESSIONAL ETHICS IN ENGINEERING****LT P C  
3 0 0 3****OBJECTIVE:**

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

**UNIT I HUMAN VALUES****10**

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.

**UNIT II ENGINEERING ETHICS****9**

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION****9**

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS****9**

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

**UNIT V GLOBAL ISSUES****8**

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility.

**TOTAL: 45 PERIODS**

# **A SMART GLOVE FOR ASSISTING BLIND PEPOLE**

**A PROJECT REPORT**

*Submitted by*

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<b>MAMTHA S</b>	<b>(712819106009)</b>
<b>RAMAN V</b>	<b>(712819106501)</b>
<b>VIMAL RAJA S</b>	<b>(712819106018)</b>

*in partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

*In*

**ELECTRONICS AND COMMUNICATION AND ENGINEERING**

**RVS COLLEGE OF ENGINEERING AND TECHNOLOGY**

**COIMBATORE-641402**

**ANNA UNIVERSITY: CHENNAI 600025**

**MAY 2023**



**ANNA UNIVERSITY: CHENNAI 600025**

**BONAFIDE CERTIFICATE**

Certified that this project report "A SMART GLOVE FOR ASSISTING BLIND PEOPLE" is the bonafided work of "DURGA D (712819106004), MAMTHA S (712819106009), RAMAN.V (712819106501), VIMALRAJA S (712819106018)"who carried out the project work under my supervision.

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Coimbatore-641 402.

Submitted for Semester Project viva-voce examination held on.....

  
**INTERNAL EXAMINER**

**EXTERNAL EXAMINER**



# ABSTRACT CONTENTS

In this project, we introduce a smart Glove system for assisting blind people. The smart Glove comes as a proposed solution to enable visually impaired people to find difficulties in detecting obstacles and dangers in front of them during walking and to identify the world around. The system is designed to act like an artificial vision and alarm unit the system consists of three sensors: ultrasonic sensor, Temperature sensor, and pulse sensor, microcontroller (ESP32) to receive the sensor signals and process them to short pulses to the ESP32 pins where buzzers and voice alarms are connected. We seek in our project to provide a smart stick affordable and suitable for most blind people, and also it is light in weight. It can be made available to all segments of the society and their families who need them.

1.1 PROJECT OBJECTIVE	1
1.2 BLOCK DIAGRAM	5
1.3 WIRING PRINCIPLE	8
2.1 SYSTEM DEVELOPMENT	6
2.1.1 HARDWARE DESCRIPTION	7
2.1.1.1 ESP32	7
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## CHAPTER 5

### CONCLUSION & FUTURE WORK

The project proposed the design and architecture of a new concept of Smart Electronic Guiding glove for blind people. The advantage of the system lies in the fact that it can prove to be very low cost solution to millions of blind person worldwide. The proposed combination of various working units makes a real time system that provides feedback making navigation more safe and secure.

#### FUTURE WORK

It can be further enhanced by using VLSI technology to design the PCB unit. This makes the system further more compact. The use of active RFID tags will transmit the location information automatically to the PCB unit, when the intelligent stick is in its range. The RFID sensor doesn't have to read it explicitly.

**OBJECTIVES:**

The student should be made to:

- Learn Ad hoc network and Sensor Network fundamentals
- Understand the different routing protocols
- Have an in-depth knowledge on sensor network architecture and design issues
- Understand the transport layer and security issues possible in Ad hoc and Sensor networks
- Have an exposure to mote programming platforms and tools

**UNIT I AD HOC NETWORKS – INTRODUCTION AND ROUTING PROTOCOLS 9**

Elements of Ad hoc Wireless Networks, Issues in Ad hoc wireless networks, Example commercial applications of Ad hoc networking, Ad hoc wireless Internet, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols, Table Driven Routing Protocols - Destination Sequenced Distance Vector (DSDV), On-Demand Routing protocols –Ad hoc On-Demand Distance Vector Routing (AODV).

**UNIT II SENSOR NETWORKS – INTRODUCTION & ARCHITECTURES 9**

Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks, WSN application examples, Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Network Architecture - Sensor Network Scenarios, Transceiver Design Considerations, Optimization Goals and Figures of Merit.

**UNIT III WSN NETWORKING CONCEPTS AND PROTOCOLS 9**

MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, The Mediation Device Protocol, Contention based protocols - PAMAS, Schedule based protocols – LEACH, IEEE 802.15.4 MAC protocol, Routing Protocols- Energy Efficient Routing, Challenges and Issues in Transport layer protocol.

**UNIT IV SENSOR NETWORK SECURITY 9**

Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Layer wise attacks in wireless sensor networks, possible solutions for jamming, tampering, black hole attack, flooding attack. Key Distribution and Management, Secure Routing – SPINS, reliability requirements in sensor networks.

**UNIT V SENSOR NETWORK PLATFORMS AND TOOLS 9**

Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms – TinyOS, nesC, CONTIKIOS, Node-level Simulators – NS2 and its extension to sensor networks, COOJA, TOSSIM, Programming beyond individual nodes – State centric programming.

**TOTAL:45 PERIODS**

**OUTCOMES:**

At the end of the course, the student would be able to:

- Know the basics of Ad hoc networks and Wireless Sensor Networks
- Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement
- Apply the knowledge to identify appropriate physical and MAC layer protocols
- Understand the transport layer and security issues possible in Ad hoc and sensor networks.
- Be familiar with the OS used in Wireless Sensor Networks and build basic modules

**TEXT BOOKS:**

1. C. Siva Ram Murthy and B. S. Manoj, "Ad Hoc Wireless Networks Architectures and Protocols", Prentice Hall, PTR, 2004. (UNIT I)
2. Holger Karl , Andreas willig, "Protocol and Architecture for Wireless Sensor Networks", John wiley publication, Jan 2006.(UNIT II-V)

**REFERENCES:**

1. Feng Zhao, Leonidas Guibas, "Wireless Sensor Networks: an information processing approach", Elsevier publication, 2004.
2. Charles E. Perkins, "Ad Hoc Networking", Addison Wesley, 2000.
3. I.F. Akyildiz, W. Su, Sankarasubramaniam, E. Cayirci, "Wireless sensor networks: a survey", computer networks, Elsevier, 2002, 394 - 422.

**EC8711****EMBEDDED LABORATORY**

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**OBJECTIVES:****The student should be made to:**

- Learn the working of ARM processor
- Understand the Building Blocks of Embedded Systems
- Learn the concept of memory map and memory interface
- Write programs to interface memory, I/Os with processor
- Study the interrupt performance

**LIST OF EXPERIMENTS:**

1. Study of ARM evaluation system
2. Interfacing ADC and DAC.
3. Interfacing LED and PWM.
4. Interfacing real time clock and serial port.
5. Interfacing keyboard and LCD.
6. Interfacing EPROM and interrupt.
7. Mailbox.
8. Interrupt performance characteristics of ARM and FPGA.
9. Flashing of LEDS.
10. Interfacing stepper motor and temperature sensor.
11. Implementing zigbee protocol with ARM.

**TOTAL: 60 PERIODS****OUTCOMES:****At the end of the course, the student should be able to:**

- Write programs in ARM for a specific Application
- Interface memory, A/D and D/A convertors with ARM system
- Analyze the performance of interrupt
- Write program for interfacing keyboard, display, motor and sensor.
- Formulate a mini project using embedded system

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS (3 students per batch)**

Embedded trainer kits with ARM board 10 Nos

Embedded trainer kits suitable for wireless communication 10 Nos

Adequate quantities of Hardware, software and consumables

# IOT BASED SMART HELMET AND ALCOHOL DETECTION SYSTEM

A PROJECT REPORT

*Submitted by*

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**COIMBATORE**

**ANNA UNIVERSITY: CHENNAI 600 025**

**MAY 2023**



# ANNA UNIVERSITY: CHENNAI 600 025

## BONAFIDE CERTIFICATE

Certified that this project report titled "IOT BASED SMART HELMET AND ALCOHOL DETECTION SYSTEM" is the bonafide work of "ANUPRIYA J (712819106701), MADHAVASHANMUGAM D (712819106703), VASUKI V(712819106704), SUDALAI M(712819106706)" who carried out the project work under my supervision.



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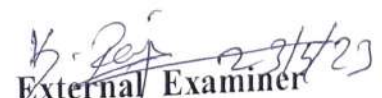
Coimbatore - 641 402.

Submitted for the project viva-voce examination held on

23-05-23



**Internal Examiner**



**External Examiner**

## ABSTRACT

Today in India, every four-minute one individual passes on because of street mishaps. Out of all mishaps, 25% record for 2-wheeler mishaps. As per ongoing investigations, 98.6% of bikers who kicked the bucket, was not wearing a cap. A savvy head protector is a creative method of building a cap with the most recent innovations. The standard objective of this venture is to structure a shrewd system that will shield a drunkard individual from driving and besides recognize setback accepting any. This framework is fit for giving security and well-being to the bikers against street mishaps. The circuit is structured so that the bicycle won't start without wearing a protective cap. The savvy protective cap is fixed with sensors that can identify whether the individual is wearing a head protector or not.

FIGURE NO.	NAME OF FIGURE	PAGE
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## CHAPTER 8

### CONCLUSION

Accident cases occur due to motorcycles. The major accidents are increased by drinking alcohol and this is due to the absence of a helmet. In this we have developed an electronic intelligent helmet system, which efficiently check wearing of helmet and drunk -driving. By implementing this technology, the rate of accident due to alcohol consumption can be significantly reduced. The proposed research work has introduced advanced sensor technologies and radio frequency during this project to enhance its efficiency.

Our Smart Helmet is an intelligent system which will aid more secured bike riding. Regarding the poor condition of our roads, wearing a helmet is imperative while riding a motorcycle because it can save the rider from severe injury to the head in the case of an accident. So, this is where the sharp IR sensor will come into action. It will ensure that the rider must wear the helmet to start the bike. Drunk driving is also an important issue to consider nowadays. Because drunk driving can cause more accidents in the case of bikes than cars. So, the alcohol sensor will check if the driver is drunk or not. Smart helmets are very popular in Western and European countries, but the concept is not familiar in Bangladesh yet. If we can make our design more full-proof and get a sponsorship, then we will be to mass produce it. A smart helmet maybe a little bit more expensive than a regular helmet but its benefits certainly outweigh the costs.



## OUTCOMES:

At the end of the course, the student should be able to:

- Realize basic elements in optical fibers, different modes and configurations.
- Analyze the transmission characteristics associated with dispersion and polarization techniques.
- Design optical sources and detectors with their use in optical communication system.
- Construct fiber optic receiver systems, measurements and coupling techniques.
- Design optical communication systems and its networks.

## TEXT BOOKS:

1. P Chakrabarti, "Optical Fiber Communication", McGraw Hill Education (India) Private Limited, 2016 (UNIT I, II, III)
2. Gred Keiser, "Optical Fiber Communication", McGraw Hill Education (India) Private Limited. Fifth Edition, Reprint 2013. (UNIT I, IV, V)

## REFERENCES:

1. John M.Senior, "Optical fiber communication", Pearson Education, second edition.2007.
2. Rajiv Ramaswami, "Optical Networks " , Second Edition, Elsevier , 2004.
3. J.Gower, "Optical Communication System", Prentice Hall of India, 2001.
4. Govind P. Agrawal, "Fiber-optic communication systems", third edition, John Wiley & sons, 2004.

EC8791

EMBEDDED AND REAL TIME SYSTEMS

L T P C  
3 0 0 3

## OBJECTIVES:

The student should be made to:

- Understand the concepts of embedded system design and analysis
- Learn the architecture and programming of ARM processor
- Be exposed to the basic concepts of embedded programming
- Learn the real time operating systems

## UNIT I INTRODUCTION TO EMBEDDED SYSTEM DESIGN 9

Complex systems and micro processors– Embedded system design process –Design example: Model train controller- Design methodologies- Design flows - Requirement Analysis – Specifications-System analysis and architecture design – Quality Assurance techniques - Designing with computing platforms – consumer electronics architecture – platform-level performance analysis.

## UNIT II ARM PROCESSOR AND PERIPHERALS 9

ARM Architecture Versions – ARM Architecture – Instruction Set – Stacks and Subroutines – Features of the LPC 214X Family – Peripherals – The Timer Unit – Pulse Width Modulation Unit – UART – Block Diagram of ARM9 and ARM Cortex M3 MCU.

## UNIT III EMBEDDED PROGRAMMING 9

Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.



**UNIT IV REAL TIME SYSTEMS****9**

Structure of a Real Time System — Estimating program run times – Task Assignment and Scheduling – Fault Tolerance Techniques – Reliability, Evaluation – Clock Synchronisation.

**UNIT V PROCESSES AND OPERATING SYSTEMS****9**

Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive real-time operating systems- Priority based scheduling- Interprocess communication mechanisms – Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX-Windows CE. - Distributed embedded systems – MPSoCs and shared memory multiprocessors. – Design Example - Audio player, Engine control unit – Video accelerator.

**TOTAL: 45 PERIODS****OUTCOMES:****At the end of the course, the student should be able to:**

- Describe the architecture and programming of ARM processor
- Outline the concepts of embedded systems
- Explain the basic concepts of real time operating system design
- Model real-time applications using embedded-system concepts

**TEXT BOOKS:**

1. Marilyn Wolf, “Computers as Components - Principles of Embedded Computing System Design”, Third Edition “Morgan Kaufmann Publisher (An imprint from Elsevier), 2012. (UNIT I, II, III, V)
2. Jane W.S.Liu,” Real Time Systems”, Pearson Education, Third Indian Reprint, 2003.(UNIT IV)

**REFERENCES:**

1. Lyla B.Das, “Embedded Systems : An Integrated Approach” Pearson Education, 2013.
2. Jonathan W.Valvano, “Embedded Microcomputer Systems Real Time Interfacing”, Third Edition Cengage Learning, 2012.
3. David. E. Simon, “An Embedded Software Primer”, 1st Edition, Fifth Impression, Addison-Wesley Professional, 2007.
4. Raymond J.A. Buhr, Donald L.Bailey, “An Introduction to Real-Time Systems- From Design to Networking with C/C++”, Prentice Hall, 1999.
5. C.M. Krishna, Kang G. Shin, “Real-Time Systems”, International Editions, Mc Graw Hill 1997
6. K.V.K.K.Prasad, “Embedded Real-Time Systems: Concepts, Design & Programming”, Dream Tech Press, 2005.
7. Sriram V Iyer, Pankaj Gupta, “Embedded Real Time Systems Programming”, Tata Mc Graw Hill, 2004.



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**BONAFIDE CERTIFICATE**

Certified that this project report "AUTOMATIC LPG BOOKING, LEAKAGE DETECTION AND REAL TIME GAS MEASUREMENT MONITORING SYSTEM" is the bonafide work of "JEEVANANTH T, PRADEEP KUMAR S, UDHAYA KUMAR S" who carried out the project work under my supervision.



**SIGNATURE**

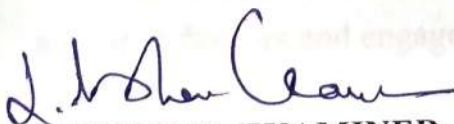
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**INTERNAL EXAMINER**



**EXTERNAL EXAMINER**

## ABSTRACT

The automatic LPG booking, leakage detection, and real-time gas measurement monitoring system is an advanced solution designed to enhance the safety and convenience of LPG (liquefied petroleum gas) usage in residential and commercial settings. The system integrates various technologies to automate the LPG booking process, detect gas leaks promptly, and provide real-time monitoring of gas levels. The system starts with an automated LPG booking feature, where users can register their LPG requirements through a mobile application. Gas sensors are installed in strategic locations, such as the kitchen or storage area, to monitor for any gas leaks. The system can alert the user through a mobile app or SMS, allowing them to take immediate action and mitigate the risk. Weight sensors equipped with IoT (Internet of Things) capabilities are installed on the LPG cylinders or storage tanks. Users can access this data through the mobile application or web portal to keep track of their gas consumption and plan their refills accordingly. Overall, the automatic LPG booking, leakage detection, and real-time gas measurement monitoring system offers a comprehensive solution to enhance the safety, efficiency, and convenience of LPG usage. By automating the booking process, detecting leaks promptly, and providing real-time gas monitoring, the system aims to minimize the risk of accidents, improve supply chain management, and empower users with better control over their gas consumption.



## 6.1 CONCLUSIONS

A cost-effective gas leakage detection system was proposed, designed and successfully implemented in this paper. Along with gas leakage detection, this system gives a fully automated approach towards the gas booking. Real time weight measurement of the gas and its display on LCD makes it an efficient home security system and can be used in industries and other places to detect gas leaks. The cost involved in developing the system is significantly low and is much less than the cost of gas detectors commercially available in the market.

## 6.2 FUTURE AND SCOPE

The automatic LPG booking, leakage detection, and real-time gas measurement monitoring system is an advanced solution designed to enhance the safety and convenience of LPG (liquefied petroleum gas) usage in residential and commercial settings. The system integrates various technologies to automate the LPG booking process, detect gas leaks promptly, and provide real-time monitoring of gas levels. The system starts with an automated LPG booking feature, where users can register their LPG requirements through a mobile application or a web portal. The system maintains a centralized database of registered users and their consumption patterns to streamline the supply chain and ensure timely delivery of LPG cylinders. To address safety concerns, the system incorporates a leakage detection mechanism. Gas sensors are installed in strategic locations, such as the kitchen or storage area, to monitor for any gas leaks. These sensors continuously measure the gas levels and trigger an alarm or notification in case of a leak. The system can alert the user through a mobile app, email, or SMS, allowing them to take immediate action and mitigate the risk.

9. Implementation of distance vector routing algorithm
10. Implementation of Link state routing algorithm
11. Study of Network simulator (NS) and simulation of Congestion Control Algorithms using NS
12. Implementation of Encryption and Decryption Algorithms using any programming language

**TOTAL: 60 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Communicate between two desktop computers
- Implement the different protocols
- Program using sockets.
- Implement and compare the various routing algorithms
- Use the simulation tool.

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS**

**SOFTWARE**

- C / Python / Java / Equivalent Compiler
- MATLAB SOFTWARE (Few experiments can be practiced with MATLAB)
- Standard LAN Trainer Kits 4 Nos
- Network simulator like NS2/ NS3 / Glomosim/OPNET/ 30 Equivalent

**HARDWARE**

Standalone Desktops 30 Nos

**EC8691**

**MICROPROCESSORS AND MICROCONTROLLERS**

**L T P C**  
**3 0 0 3**

**OBJECTIVES:**

- To understand the Architecture of 8086 microprocessor.
- To learn the design aspects of I/O and Memory Interfacing circuits.
- To interface microprocessors with supporting chips.
- To study the Architecture of 8051 microcontroller.
- To design a microcontroller based system

**UNIT I THE 8086 MICROPROCESSOR**

**9**

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

**UNIT II 8086 SYSTEM BUS STRUCTURE**

**9**

8086 signals – Basic configurations – System bus timing – System design using 8086 – I/O programming – Introduction to Multiprogramming – System Bus Structure – Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

**UNIT III I/O INTERFACING**

**9**

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

**UNIT IV MICROCONTROLLER****9**

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

**UNIT V INTERFACING MICROCONTROLLER****9**

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation - Comparison of Microprocessor, Microcontroller, PIC and ARM processors

**TOTAL: 45 PERIODS****OUTCOMES:**

**At the end of the course, the students should be able to:**

- Understand and execute programs based on 8086 microprocessor.
- Design Memory Interfacing circuits.
- Design and interface I/O circuits.
- Design and implement 8051 microcontroller based systems.

**TEXT BOOKS:**

1. Yu-Cheng Liu, Glenn A.Gibson, “Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design”, Second Edition, Prentice Hall of India, 2007. (UNIT I-III)
2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson education, 2011. (UNIT IV-V)

**REFERENCES:**

1. Douglas V.Hall, “Microprocessors and Interfacing, Programming and Hardware”,TMH,2012
2. A.K.Ray,K.M.Bhurchandi, "Advanced Microprocessors and Peripherals" 3<sup>rd</sup> edition, Tata McGrawHill, 2012

**EC8095****VLSI DESIGN**

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**OBJECTIVES:**

- Study the fundamentals of CMOS circuits and its characteristics.
- Learn the design and realization of combinational & sequential digital circuits.
- Architectural choices and performance tradeoffs involved in designing and realizing the circuits in CMOS technology are discussed
- Learn the different FPGA architectures and testability of VLSI circuits.

**UNIT I INTRODUCTION TO MOS TRANSISTOR****9**

MOS Transistor, CMOS logic, Inverter, Pass Transistor, Transmission gate, Layout Design Rules, Gate Layouts, Stick Diagrams, Long-Channel I-V Characteristics, C-V Characteristics, Non ideal I-V Effects, DC Transfer characteristics, RC Delay Model, Elmore Delay, Linear Delay Model, Logical effort, Parasitic Delay, Delay in Logic Gate, Scaling.

**UNIT II COMBINATIONAL MOS LOGIC CIRCUITS****9**

**Circuit Families:** Static CMOS, Ratioed Circuits, Cascode Voltage Switch Logic, Dynamic Circuits, Pass Transistor Logic, Transmission Gates, Domino, Dual Rail Domino, CPL, DCVSPG, DPL, Circuit Pitfalls.

**Power:** Dynamic Power, Static Power, Low Power Architecture.

# **DENSITY BASED TRAFFIC CONTROL SYSTEM WITH IOT**

**A PROJECT REPORT**

*Submitted by*

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**MAY 2023**



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**BONAFIDE CERTIFICATE**

Certified that this project report “ **DENSITY BASED TRAFFIC CONTROL SYSTEM WITH IOT**” is the bonafided work of “**PRABHAKARAN M, SENTHILKUMARAN K, SOUNDERRAJAN R, ARULKUMAR R**” who carried out the projectwork under my supervision.



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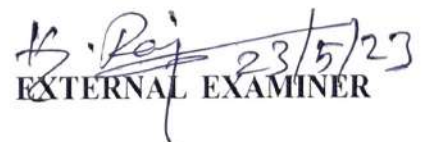
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Submitted for Semester Project viva-voce examination held on 23/5/23



**INTERNAL EXAMINER**



**EXTERNAL EXAMINER** 23/5/23

## ABSTRACT

Traffic congestion is biggest problem in many major cities and high traffic places across the world and it has become a nightmare for the commuters in these cities. The current system has fixed time given to each side of junction which cannot be varied as per varying traffic density. Junction timings allotted are fixed. When higher traffic density at which side then that side has longer green signal is allotted. The IR sensors are placed at the every 5 meters of road side which can sense the object. With the rapid development of road infrastructure, the volume of the vehicle on the road network increases which leads to traffic Congestion. This is mainly caused due to the rapid surprise in the number of vehicles in a short period. To overcome such an impact of traffic congestions, it is required to develop an IoT Based traffic control system.

The proposed system would be based on the measurement of the actual traffic density on the road. This would be achieved using real-time video and image processing techniques. Wherein the images captured and are stored in the server, which will be compared with the real-time image captured via camera to identify the density. The theme is to control the traffic by determining the traffic density on each side of the four roads and enabling a controlling option of the traffic signal to the user through a software application..



## CHAPTER-5

### CONCLUSION AND FUTURE SCOPE

In this design work, a density predicated traffic light control system was developed for traffic control at road intersection to minimize nonessential time wastage and minimize road traffic casualties which the subsisting conventional traffic light control system has failed to ignore traffic signals. Lastly, the objectives of the design were achieved. Concretely, it demonstrates a working software solution for controlling traffic predicated on the density of traffic on each lane at the intersection. The proposed method focused on overcoming the traffic congestion scenarios experienced. The system would primarily focus on the image captured using the camera. The captured image would be cross-verified with a preset image loaded in the server to identify the density. Based on the density, the traffic movements are the trigger for the junctions. This reduces the overall waiting time and results in smoother traffic flow. The system would function automatically based on the collection of density images send from the location to the server. Future Recommendation: Many upgrades on the system are foreseen with more customization that could be adapted for various applications where remote monitoring and controlling is required. The system can have more integration like incident detection and failure notification etc. With the development of advanced technology, the platform can be used to integrate various devices like parking machines, Variable Message Signs, Traffic Count Stations, and City Surveillance Cameras, etc. Giving better control and monitoring on various devices remotely. This would lead the city to have an infrastructure which is smart, and technology-driven.

**UNIT IV EMC DESIGN FOR CIRCUITS AND PCBs 9**

Noise from Relays and Switches; Nonlinearities in Circuits; Cross talk in transmission line and cross talk control; Component selection and mounting; PCB trace impedance; Routing; Power distribution decoupling; Zoning; Grounding; VIAs; Terminations.

**UNIT V EMI MEASUREMENTS AND STANDARDS 9**

Open area test site; TEM cell; EMI test shielded chamber and shielded ferrite lined anechoic chamber; Line impedance stabilization networks; EMI Rx and spectrum analyzer; Civilian standards - CISPR, FCC, IEC, EN; Military standards-MIL461E/462.

**TOTAL:45 PERIODS**

**OUTCOMES:**

**At the end of the course, the student should be able to:**

- Identify the various types and mechanisms of Electromagnetic Interference
- Propose a suitable EMI mitigation technique
- Describe the various EMC Standards and methods to measure them

**TEXT BOOKS:**

1. V.P.Kodali, "Engineering EMC Principles, Measurements and Technologies", IEEE Press, Newyork, 1996.(Unit I – V)
2. Henry W.Ott., "Noise Reduction Techniques in Electronic Systems", A Wiley Inter Science Publications, John Wiley and Sons, Newyork, 1988. (Unit – IV)

**REFERENCES:**

1. C.R.Paul,"Introduction to Electromagnetic Compatibility" , John Wiley and Sons, Inc, 1992.
2. Bemhard Keiser, "Principles of Electromagnetic Compatibility", 3rd Ed, Artech house, Norwood, 1986.
3. Don R. J.White Consultant Incorporate, "Handbook of EMI/EMC", Vol I-V, 1988.

<b>EC8007</b>	<b>LOW POWER SoC DESIGN</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES:**

**The student should be made to:**

- Identify sources of power in an IC.
- Understand basic principle of System on Chip design
- Learn optimization of power in combinational and sequential logic machines for SoC Design
- Identify suitable techniques to reduce the power dissipation and design circuits with low power dissipation.

**UNIT I POWER CONSUMPTION IN CMOS 9**

Physics of power dissipation in CMOS FET devices – Hierarchy of limits of power – Sources of power consumption – Static Power Dissipation, Active Power Dissipation - Designing for Low Power, Circuit Techniques for Leakage Power Reduction - Basic principle of low power design, Logic level power optimization – Circuit level low power design.

**UNIT II SYSTEM-ON-CHIP DESIGN 9**

System-on-Chip Concept, Design Principles in SoC Architecture, SoC Design Flow, Platform-based and IP based SoC Designs, Basic Concepts of Bus-Based Communication Architectures. High performance algorithms for ASICs/ SoCs as case studies – Canonic Signed Digit Arithmetic, KCM, Distributed Arithmetic, High performance digital filters for sigma-delta ADC



**UNIT III POWER OPTIMIZATION OF COMBINATIONAL AND SEQUENTIAL LOGIC MACHINES FOR SOC 9**

Introduction to Standard Cell-Based Layout – Simulation - Combinational Network Delay - Logic and interconnect Design - Power Optimization - **Switch Logic Networks**, Introduction - Latches and Flip-Flops - Sequential Systems and Clocking Disciplines - Sequential System Design - Power Optimization - **Design Validation** - Sequential Testing.

**UNIT IV DESIGN OF LOW POWER CIRCUITS FOR SUB SYSTEM ON A SOC 9**

Subsystem Design Principles - Combinational Shifters – Adders – ALUs – Multipliers – High Density Memory – Field Programmable Gate Arrays - Programmable Logic Arrays - Computer arithmetic techniques for low power system – **low voltage low power static Random access** and dynamic Random access memories, low power clock, Inter connect and layout design

**UNIT V FLOOR PLANNING 9**

Floor-planning Methods – Block Placement & Channel Definition - Global Routing - switchbox Routing - Power Distribution - Clock Distributions - Floor-planning Tips - Design Validation - Off-Chip Connections – Packages, The I/O Architecture - PAD Design

**TOTAL:45 PERIODS**

**OUTCOME:**

**At the end of the course, the student should be able to:**

- Analyze and design low-power VLSI circuits using different circuit technologies for system on chip design

**TEXT BOOKS:**

- J.Rabaey, “Low Power Design Essentials (Integrated Circuits and Systems)”, Springer, 2009
- Wayne Wolf, “Modern VLSI Design – System – on – Chip Design”, Prentice Hall, 3rd Edition, 2008.

**REFERENCES:**

- J.B.Kuo & J.H.Lou, “Low-voltage CMOS VLSI Circuits”, Wiley, 1999.
- A.Bellaowar & M.I.Elmasry, “Low power Digital VLSI Design, Circuits and Systems”, Kluwer, 1996.
- Wayne Wolf, “Modern VLSI Design – IP based Design”, Prentice Hall, 4th Edition, 2008.
- M.J.S. Smith : Application Specific Integrated Circuits, Pearson, 2003
- Sudeep Pasricha and NikilDutt, On-Chip Communication Architectures System on Chip Interconnect, Elsevier, 2008
- Recent literature in Low Power VLSI Circuits.
- Recent literature in Design of ASICs

**EC8008**

**PHOTONIC NETWORKS**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES:**

- To enable the student to understand the importance of the backbone infrastructure for our present and future communication needs and familiarize them with the architectures and the protocol stack in use
- To enable the student to understand the differences in the design of data plane and the control plane and the routing, switching and the resource allocation methods and the network management and protection methods in vogue
- To expose the student to the advances in networking and switching domains and the future trends

**IOT BASED SMART FAULT DETECTION AND  
MONITORING SYSTEM FOR INDUSTRIAL POWER  
DISTRIBUTION**

**A PROJECT REPORT**

*Submitted By*

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<b>VASANTHARAJ.V</b>	<b>712819106303</b>
<b>AKSHAY.K</b>	<b>712819106708</b>

*in the partial fulfillment for the award of the degree*

*of*

**BACHELOR OF ENGINEERING**

*in*

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**RVS COLLEGE OF ENGINEERING AND TECHNOLOGY  
COIMBATORE - 641402**

**ANNA UNIVERSITY: CHENNAI 600 025**

**MAY 2023**

# ANNA UNIVERSITY: CHENNAI 600 025

## BONAFIDE CERTIFICATE

Certified that this project report "IOT BASED SMART FAULT DETECTION AND MONITORING SYSTEM FOR INDUSTRIAL POWER DISTRIBUTION" is the bonafide work of "PRAVEEN.M, VASANTHARAJ.V and AKSHAY.K" who carried out the project work under my supervision.



**SIGNATURE**

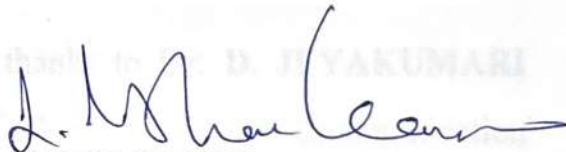
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Submitted for Semester Project viva-voce examination held on 23.05-'23



**INTERNAL EXAMINER**

B. Raj 23/5/23  
**EXTERNAL EXAMINER**

## ABSTRACT

The deployment of IOT technologies in the power distribution across the industry would significantly accelerate the detection and location of faults. Great importance to use LoRa and Digital Internet of Things systems to monitor the Power Distribution System in the industries would easily identify the occurrence of a fault on the power distribution area, thus enabling quick and immediate commencement of reparative action. In Proposed system, the following power quality parameters like Current and Voltage unbalance, Voltage dips, Short term overvoltage and total harmonic distortion will be monitored using an IOT devices and send alerts to the user in a periodical manner through the cloud services. If there is any change in variation in the following parameters, then immediately alerts will send to the users mobile or the personal computer. This will cause an efficient control in the industrial operation and provides quick response resulting in less man power and time consumption.



## CHAPTER 5

### CONCLUSION

This system which can automatically monitor the power distribution, power factor, voltage and current fluctuation of the particular machine in industry by using ESP32 microcontroller development board. It can wirelessly send the data to assigned user or supervisor's Blynk mobile application and display the results in the form of alerts and notifications. The system is loyal, remunerative and comfortable for Industries. It is beneficial for Industries which operates on less man power. This system facilitates the Machines to run smoothly and effectively to perform their duties in an effective way and also providing alerts and notification in critical level variations of the voltage, current and power factors. By the notifications and alerts received by IOT in blynk from the machine, provides continuous and accurate status of the power consumption and voltage variations it alerts the user immediately resulting in avoiding excess level of power consumption and also avoid the machine damage. This will result in efficient control in the industrial operation and provides quick response resulting in less man power and time consumption.

```
//86816 for Europe
//915E6 for North America
while ((LoRa.begin(915E6)) {
  Serial.println(" ");
  delay(500);
}
// Change sync word (0x123) to match the receiver
// The sync word ensures you don't get LoRa messages from other LoRa
```