



MOHAMED SATHAK A J COLLEGE OF ENGINEERING

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(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)

Siruseri IT Park, Egattur, Chennai 603 103

B.E – ELECTRONICS AND COMMUNICATION ENGINEERING

S.NO	Name of the course that include experiential learning through Project work/ Internship
1	IT6005- Digital Image Processing
2	EC6001- Medical Electronics
3	EC6303- Signals and Systems
4	EC6502- Digital Signal Processing
5	EC6703- Embedded and Real Time Systems
6	EC6405- Control System Engineering
7	EC6801- Wireless Communication
8	EC6504- Microprocessor and Microcontroller
9	EC6602- Antenna and Wave Propagation
10	EC6701- RF and Microwave Engineering
11	EC6201 - Electronic Devices
12	EC8252- Electronic Devices
13	EC8392- Digital Electronics
14	EC8453 - Linear Integrated Circuits
15	EC8791 - Embedded and Real Time Systems
16	EC8691- Microprocessor and Microcontroller
17	EC8551- Communication Networks



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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
1	IT6005	Digital Image Processing	<ol style="list-style-type: none">1. Digital Fundamentals: Introduction – Origin – Steps in Digital Image Processing2. Components– Elements of Visual Perception3. Image Sensing and Acquisition4. Image Sampling and Quantization5. Relationships between pixels6. Color models.7. Image enhancement-Histogram Processing8. Smoothing and sharpening Spatial Filtering9. Segmentation: Detection of discontinuities10. Edge linking and border detection11. Region based Segmentation

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OBJECTIVES:

The student should be made to:

- Learn digital image fundamentals.
- Be exposed to simple image processing techniques.
- Be familiar with image compression and segmentation techniques.
- Learn to represent image in form of features.

UNIT I DIGITAL IMAGE FUNDAMENTALS 8

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels – color models.

UNIT II IMAGE ENHANCEMENT 10

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.

UNIT III IMAGE RESTORATION AND SEGMENTATION 9

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering **Segmentation:** Detection of Discontinuities – Edge Linking and Boundary detection – Region based segmentation – Morphological processing – erosion and dilation.

UNIT IV WAVELETS AND IMAGE COMPRESSION 9

Wavelets – Subband coding – Multiresolution expansions – **Compression:** Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards.

UNIT V IMAGE REPRESENTATION AND RECOGNITION 9

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments – Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

TOTAL: 45 PERIODS**OUTCOMES:**

Upon successful completion of this course, students will be able to:

- Discuss digital image fundamentals.
- Apply image enhancement and restoration techniques.
- Use image compression and segmentation Techniques.
- Represent features of images.

TEXT BOOK:

1. Rafael C. Gonzales, Richard E. Woods, "Digital Image Processing", Third Edition, Pearson Education, 2010.

REFERENCES:

1. Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, "Digital Image Processing Using MATLAB", Third Edition Tata Mc Graw Hill Pvt. Ltd., 2011.



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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
2	EC6001	Medical Electronics	<ol style="list-style-type: none">1. The origin of Bio-potentials2. Biopotential electrodes3. Biological amplifiers4. ECG, EEG, EMG, PCG5. Lead systems and recording methods6. Typical waveforms and signal characteristics.7. Non electrical parameter- Blood pressure, temperature, pulse, Blood Cell Counters.8. Recent Trends In Medical Instrumentation- Thermograph, endoscopy unit9. Laser in medicine10. Cryogenic Application11. Introduction to telemedicine

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OBJECTIVES:

- To gain knowledge about the various physiological parameters both electrical and non electrical and the methods of recording and also the method of transmitting these parameters.
- To study about the various assist devices used in the hospitals.
- To gain knowledge about equipment used for physical medicine and the various recently developed diagnostic and therapeutic techniques.

UNIT I	ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING	9
The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, lead systems and recording methods, typical waveforms and signal characteristics.		
UNIT II	BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT	9
pH, PO ₂ , PCO ₂ , colorimeter, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood Cell Counters.		
UNIT III	ASSIST DEVICES	9
Cardiac pacemakers, DC Defibrillator, Dialyser, Heart lung machine		
UNIT IV	PHYSICAL MEDICINE AND BIOTELEMETRY	9
Diathermies- Shortwave, ultrasonic and microwave type and their applications, Surgical Diathermy Telemetry principles, frequency selection, biotelemetry, radiopill, electrical safety		
UNIT V	RECENT TRENDS IN MEDICAL INSTRUMENTATION	9
Thermograph, endoscopy unit, Laser in medicine, cryogenic application, Introduction to telemedicine		

TOTAL: 45 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to:

- Discuss the application of electronics in diagnostic and therapeutic area.
- Measure biochemical and various physiological information.
- Describe the working of units which will help to restore normal functioning.

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TEXTBOOKS:

1. Leslie Cromwell, "Biomedical Instrumentation and Measurement", Prentice Hall of India, New Delhi, 2007.
2. John G. Webster, "Medical Instrumentation Application and Design", 3rd Edition, Wiley India Edition, 2007

REFERENCES:

1. Khandpur, R.S., "Handbook of Biomedical Instrumentation", TATA Mc Graw-Hill, New Delhi, 2003.
2. Joseph J. Carr and John M. Brown, "Introduction to Biomedical Equipment Technology", John Wiley and Sons, New York, 2004.



2. Anil Jain K. "Fundamentals of Digital Image Processing", PHI Learning Pvt. Ltd., 2011.
3. William K Pratt, "Digital Image Processing", John Willey, 2002.
4. Malay K. Pakhira, "Digital Image Processing and Pattern Recognition", First Edition, PHI Learning Pvt. Ltd., 2011.
5. <http://eeweb.poly.edu/~onur/lectures/lectures.html>.
6. <http://www.caen.uiowa.edu/~dip/LECTURE/lecture.html>



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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
3	EC6303	Signals and Systems	<ol style="list-style-type: none">1. Classification of signals and systems: Continuous time signals (CT signals) - Discrete time signals (DT signals) Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential,2. Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals3. CT systems and DT systems-Classification of systems – Static & Dynamic, Linear & Nonlinear, Time - variant & Time-invariant, Causal & Noncausal, Stable & Unstable.

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OBJECTIVES:

- To understand the basic properties of signal & systems and the various methods of classification
- To learn Laplace Transform & Fourier transform and their properties
- To know Z transform & DTFT and their properties
- To characterize LTI systems in the Time domain and various Transform domains

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS 9

Continuous time signals (CT signals) - Discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential, Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - CT systems and DT systems - Classification of systems - Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS 9

Fourier series analysis-spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in CT Signal Analysis - Properties.

UNIT III LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS 9

Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis of CT systems

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS 9

Baseband Sampling - DTFT - Properties of DTFT - Z Transform - Properties of Z Transform

UNIT V LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS 9

Difference Equations-Block diagram representation-Impulse response - Convolution sum- Discrete Fourier and Z Transform Analysis of Recursive & Non-Recursive systems

TOTAL (L:45+T:15): 60 PERIODS**OUTCOMES:**

Upon the completion of the course, students will be able to:

- Analyze the properties of signals & systems
- Apply Laplace transform, Fourier transform, Z transform and DTFT in signal analysis
- Analyze continuous time LTI systems using Fourier and Laplace Transforms
- Analyze discrete time LTI systems using Z transform and DTFT


TEXT BOOK:

1. Allan V. Oppenheim, S. Wilsky and S. H. Nawab, "Signals and Systems", Pearson, 2007.

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REFERENCES:

1. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
2. R. E. Zeimer, W. H. Tranter and R. D. Fannin, "Signals & Systems - Continuous and Discrete", Pearson, 2007.
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007.
4. M. J. Roberts, "Signals & Systems Analysis using Transform Methods & MATLAB", Tata McGraw Hill, 2007.





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S.No	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
4	EC6502	Principles of Digital signal processing	<ol style="list-style-type: none">1. Linear Filtering2. IIR Filter Design: Structures of IIR3. Analog filter design – Discrete time IIR filter from analog filter4. IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives5. (LPF, HPF, BPF, BRF) filter design using frequency translation.6. FIR Filter Design: Structures Of FIR7. Linear phase FIR filter8. Fourier Series9. Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window)10. Frequency sampling techniques11. Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.

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OBJECTIVES:

- To learn discrete Fourier transform and its properties
- To know the characteristics of IIR and FIR filters learn the design of infinite and finite impulse response filters for filtering undesired signals
- To understand Finite word length effects
- To study the concept of Multirate and adaptive filters

UNIT I DISCRETE FOURIER TRANSFORM

9

Discrete Signals and Systems- A Review - Introduction to DFT - Properties of DFT - Circular Convolution - Filtering methods based on DFT - FFT Algorithms -Decimation in time Algorithms, Decimation in frequency Algorithms - Use of FFT in **Linear Filtering.**

UNIT II IIR FILTER DESIGN

9

Structures of IIR - Analog filter design - Discrete time IIR filter from analog filter - IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives - (LPF, HPF, BPF, BRF) filter design using frequency translation.

UNIT III FIR FILTER DESIGN

9

Structures of FIR - Linear phase FIR filter - Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques - Finite word length effects in digital Filters: Errors, Limit Cycle, Noise Power Spectrum.

UNIT IV FINITE WORDLENGTH EFFECTS

9

Fixed point and floating point number representations - ADC -Quantization- Truncation and Rounding errors - Quantization noise - coefficient quantization error - Product quantization error - Overflow error - Roundoff noise power - limit cycle oscillations due to product round off and overflow errors - Principle of scaling

UNITV DSP APPLICATIONS

9

Multirate signal processing: Decimation, Interpolation, Sampling rate conversion by a rational factor - Adaptive Filters: Introduction, Applications of adaptive filtering to equalization.

TOTAL (L:45+T:15): 60 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to

- apply DFT for the analysis of digital signals & systems
- design IIR and FIR filters
- characterize finite Word length effect on filters
- design the Multirate Filters
- apply Adaptive Filters to equalization

TEXT BOOK:

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth Edition, Pearson Education / Prentice Hall, 2007.

REFERENCES:

1. Emmanuel C..Ifeachor, & Barrie.W.Jervis, "Digital Signal Processing", Second Edition, Pearson Education / Prentice Hall, 2002.
2. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Tata Mc Graw Hill, 2007.
3. A.V.Oppenheim, R.W. Schafer and J.R. Buck, "Discrete-Time Signal Processing", 8th Indian Reprint, Pearson, 2004.
4. Andreas Antoniou, "Digital Signal Processing", Tata Mc Graw Hill, 2006.



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GLAUCOMA DETECTION USING FUNDUS IMAGES OF THE EYE

A PROJECT REPORT

Submitted by

FOWZUL HAFSA M.N (311816106009)

PRIYANKA P (311816106017)

in partial fulfillment for the award of the degree

of

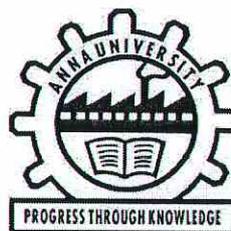
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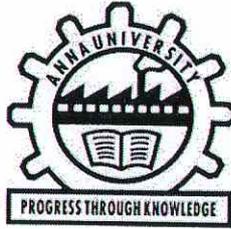


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SEPTEMBER- 2020



ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report “**GLAUCOMA DETECTION USING FUNDUS IMAGES OF THE EYE**” is the bonafide work of **FOWZUL HAFSA M.N (311816106009), PRIYANKA P (311816106017)** who carried out the project work under my supervision.

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Project Viva-Voce held on 22-09-2020

INTERNAL EXAMINER

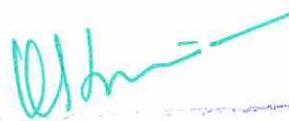


EXTERNAL EXAMINER

ABSTRACT

Glaucoma is one of the leading causes of irreversible blindness in people over 40 years old. In Colombia there is a high prevalence of the disease, being worse the fact that there is a high prevalence of the disease, being worse the fact that there are not enough ophthalmologists for the country's population. Fundus imaging is the most used screening technique for glaucoma detection for its trade-off between portability, size and costs. In this paper we present a computational tool for automatic **glaucoma detection**. We report improvements for disc **segmentation** in comparison with other works on the literature, a novel method to segment the cup by **thresholding** and a new measure between the size of the cup and the size of the disc. Results were obtained from a set of fundus images in collaboration with the Centre of Prevention and Attention of Glaucoma in Bucaramanga, Colombia.

Keywords: glaucoma, fundus.

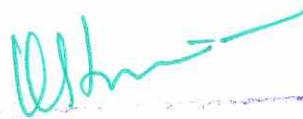


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CHAPTER 7

CONCLUSION AND FUTURE SCOPE

The presence of the cup in the disc is a strong indicator of glaucoma, a method to detect glaucoma was presented here by properly detecting the location of the cup. The disc **segmentation** was done by **thresholding**, the vessel segmentation was done using edge detection, and for the cup segmentation it was presented a method that uses the vessels and the cup intensities. Future work concerns to obtain a bigger dataset of fundus images to make a **deeper test of the algorithm**. The vessels segmentation requires an improvement due to some fails in different images and residual noise after the segmentation. The use of **convolutional neural networks** is part of the future work to improve the classification. In future, authors will be exploring the possibility of testing the performance of this technique with huge database and detect glaucoma at an early stage.



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**FINGER VEIN AUTHENTICATION USING
PROBABILISTIC NEURAL NETWORK**

A PROJECT REPORT

Submitted by

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SALMA ARIFA.S (311816106019)

SHAKIRAFATHIMA.S (311816106021)

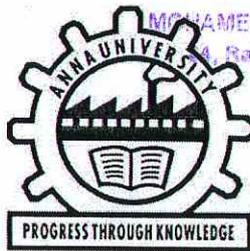
In partial fulfilment for the award of the degree

of

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IN

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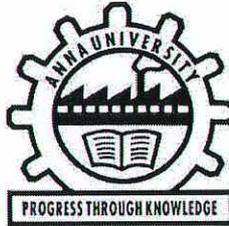
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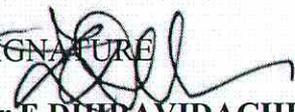
SEPTEMBER 2020



ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDECERTIFICATE

Certified that this project report “**FINGER VEIN AUTHENTICATION USING PROBABILISTIC NEURAL NETWORK**” is the bonafide work of **RAHEEL FAHIMA.P.T.S (311816106018), SALMA ARIFA.S (311816106019), SHAKIRAFATHIMA.S (311816106021)** who carried out the project work under my supervision.

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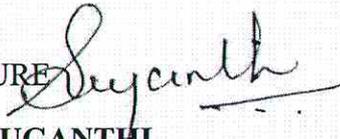
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Project Viva-Voce held on 22-09-2020

INTERNAL EXAMINER



EXTERNAL EXAMINER

ABSTRACT

Finger vein recognition is a method of biometric authentication that uses pattern recognition techniques based on images of human finger vein patterns beneath the skin's surface. **Finger vein recognition** is one of many forms of biometrics used to identify individuals and verify their identity. Finger Vein ID is a biometric authentication system that matches the vascular pattern in an individual's finger to previously obtained data. The technology is currently in use or development for a wide variety of applications, including credit card authentication, automobile security, employee time and attendance tracking, computer and network authentication, end point security and automated teller machines. The demand for simple, convenient, and high security authentication systems for protecting private information's stored in mobile devices has steadily increased with the development of consumer electronics. The personal information's can be protected in the form of biometrics which uses human **physiological or behavioural features** for personal identification.

Key words: **Pattern recognition, Biometrics authentication**



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CONCLUSION

FingerVein method is an excellent method for verification since it is embedded inside the skin and hence cannot be forgotten or stolen. The image captured is pre-processed, ROI features are extracted and PNN is applied to identify a person. Binarization segmentation is comparatively more efficient than clustering segmentation for finger vein. The unique features of the segmented images were extracted using HOG. On that features PNN is used to classify. PNN is widely researched to find more efficient classification solutions. In short the development of PNN used is entirely different from normal algorithms used for learning and PNN used provides a new insight into this learning. Thus it provides various applications in biometric authentication like passport office, ATMs, access control to banks etc. For future works, a finger vein real time system is to be developed.



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**DETECTION OF INVASIVE AND NON INVASIVE
DUCTAL CARCINOMA**

A PROJECT REPORT

Submitted by

R.AFSHAN FATHIMA (311816106002)

NASREEN BINTI SAHUL HAMEED (311816106014)

R.NAUSHEEN BANU (311816106015)

in partial fulfillment for the award of the degree

of



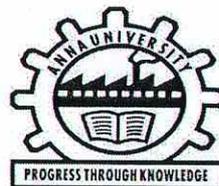
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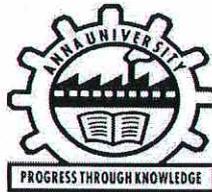
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SEPTEMBER 2020





ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report “**DETECTION OF INVASIVE AND NON INVASIVE DUCTAL CARCINOMA**” is the bonafide work of **AFSHAN FATHIMA R (311816106002), NASREEN BINTI SAHUL HAMEED (311816106014), NAUSHEEN BANU R (311816106015)** who carried out the project work under my supervision.

SIGNATURE

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Professor and Head

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Project Viva-Voce held on **22-09-2020**

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SIGNATURE

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Associate professor

SUPERVISOR

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EXTERNAL EXAMINAR

ABSTRACT

In the field of radiology, mammographic screened images (i.e. X-rays image sensing) square measure terribly difficult and difficult to interpret. The skilled radiotherapist visually hunts the mammograms for any specific abnormality. However, human factor causes an occasional degree of preciseness which frequently ends up in biopsy and anxiety for the patient concerned. This paper proposes a novel Computer-Aided Detection (CAD) system to scale back the human issue involvement and to assist the radiotherapist in automatic diagnosing of benign/malignant breast tissues by utilizing the basic morphological operations. The input Region of Interest (ROI) is extracted manually and subjected to additional variety of preprocessing stages. The geometrical and texture features are used for feature extraction of suspicious region. After that a KNN classifier is introduced to classify the required class of the breast cancer. After that we use aurduino controller for displaying the outputs using LCD display.

Keywords: Benign, Malignant



A handwritten signature in blue ink, appearing to be "Mohamed Sathak A.J.", written over a horizontal line.

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CHAPTER 5

CONCLUSION AND REFERENCES

5.1 CONCLUSION

This paper proposes novel breast cancer **detection** and **classification** method which uses **region based and texture based features** for breast cancer representation and classification. The proposed method was evaluated on a set created from **mammogram database images**. We have showed that the proposed method is efficient and effective for the detection and classification of benign and malignant breast cancers effectively. In this paper we combine region features and texture features, taking the doctor's experience and the essential attributes of the mammogram into account at the same time.



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S.No	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
5	EC8703	Embedded and Real time systems	<ol style="list-style-type: none">1. Introduction to Embedded Computing: Complex Systems and Micro Processors2. Embedded System Design Process3. Design Example: Model Train Controller-4. Instruction Sets Preliminaries5. Real -time operating systems6. System Design Techniques And Networks:7. Design methodologies8. Design flows9. Requirement Analysis – Specifications-System analysis and architecture design10. Quality Assurance techniques11. Distributed embedded systems12. MPSoCs and shared memory multi processors.

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OBJECTIVES:

The student should be made to:

- Learn the architecture and programming of ARM processor.
- Be familiar with the embedded computing platform design and analysis.
- Be exposed to the basic concepts of real time Operating system.
- Learn the system design techniques and networks for embedded systems

UNIT I INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS

9

Complex systems and micro processors- Embedded system design process -Design example: Model train controller- Instruction sets preliminaries - ARM Processor - CPU: programming input and output-supervisor mode, exceptions and traps - Co-processors- Memory system mechanisms - CPU performance- CPU power consumption.

UNIT II EMBEDDED COMPUTING PLATFORM DESIGN

9

The CPU Bus-Memory devices and systems-Designing with computing platforms - consumer electronics architecture - platform-level performance analysis - 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 III 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.

UNIT V SYSTEM DESIGN TECHNIQUES AND NETWORKS

9

Design methodologies- Design flows - Requirement Analysis - Specifications-System analysis and architecture design - Quality Assurance techniques- Distributed embedded systems - MPSoCs and shared memory multiprocessors.

UNIT V CASE STUDY

9

Data compressor - Alarm Clock - Audio player - Software modem-Digital still camera - Telephone answering machine-Engine control unit - Video accelerator.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, students will 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.
- Use the system design techniques to develop software for embedded systems
- Differentiate between the general purpose operating system and the real time operating system
- Model real-time applications using embedded-system concepts

TEXT BOOK:

1. Marilyn Wolf, "Computers as Components - Principles of Embedded Computing System Design",



Third Edition "Morgan Kaufmann Publisher (An imprint from Elsevier), 2012.

REFERENCES:

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





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**BRaille BASED MOBILE COMMUNICATION
USING EMBEDDED**

A PROJECT REPORT

Submitted by

M. ANSAARI

(Reg.no:311816106003)

A. DHARVESH MOHAIDEEN

(Reg.no:311816106007)

In partial fulfillment for the award of the degree

of

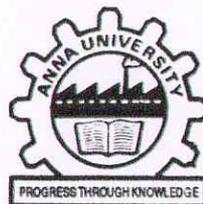
BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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SEPTEMBER 2020



ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report “ BRAILLE BASED **MOBILE COMMUNICATION USING EMBEDDED** ” is the bonafide work of “M.ANSAARI (311816106003), A. DHARVESH MOHAIDEEN(311816106007)” who carried out the project work under my supervision.



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Mr.M.L. SYED ALI

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Submitted for viva-voice examination held on 22-09-2020 .. at



Mohammed Sathak A.J College of engineering, Chennai-603 103



INTERNAL EXAMINER



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EXTERNAL EXAMINER

ABSTRACT

The main objective of this project is to provide a complete solution to different communication problem in the visually impaired person's lives. In mainly We are facing India is now a home to the world's largest number of blind people. Technologies are developed day by day principally in communication through mobile phones which plays a crucial role. In message application the visually impaired people only can able to read the message in on the tactile surface of the display. But the quality of the system is not good because the blind people not able to identify the text clearly. Still now Braille technology is used by the blinds only for the reading purpose. In our Method using this Braille system both reading and replying the messages possible by visually impaired people. In this system using Braille technology the blind people can access the message application in mobiles as a normal people. At the same time keypad using one by one messages will be sending in the based on the keypad options by user can easily send the information's through Message .We are Using this system uneducated people also may use the message application in mobiles and then Easily Blind People Message getting via **GSM** for mobile service communication.




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CHAPTER 7

CONCLUSION

The blind community uses the sense of hearing and sense of touch to interact and understand the surrounding environment. Hence, the sense of touch becomes the primary sensory modality to communicate non-audible information to and from a blind person.

The 'BrailleBand' haptic device blind support device connected to smart phone applications helps the blind community to lead an independent quality life. This assistive technology enables information transmission, navigation and smart device accessibility through the sense of touch. With the development of the BrailleBand we have successfully implemented a new mode of communication to the blind using haptic technology



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RAPBERRYPI BASED HOME AUTOMATION USING SENSORS AND LIMITS

A PROJECT REPORT

Submitted by

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C.VASEEULLAH

(311816106028)

A.MOHAMED ARSATH

(311816106011)

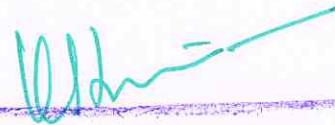
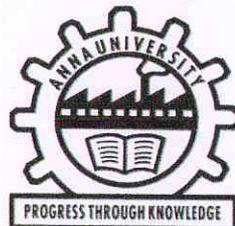
In partial fulfillment for the award of the degree

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PRINCIPAL

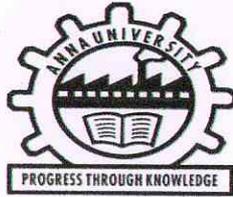
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SEPTEMBER 2020





AFFILIATED TO ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

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Submitted for Semester Examination held on: 22-09-2020

INTERNALEXAMINER

EXTERNALEXAMINER



ABSTRACT

Availability of high speed mobile networks like 3G, 4G and Long Term Evolution coupled with cheaper and accessible smart phones, mobile industry has seen a tremendous growth in terms of providing various services and applications at the fingertips of the citizens. This paper discusses about **IoT** and it can be used for realizing smart home automation using **Raspberry Pi**. This system consists of a smart phone along with webpage which is having the home appliances details with ON and OFF conditions. Smart phone is connecting with Raspberry Pi using the IP address of Raspberry Pi through **Wi-Fi**. The wireless application is user friendly improves efficiency and lifestyle. The system successfully overcomes the drawbacks in Bluetooth and **ZIGBEE** technology. Internet of Things (IoT) is one of the promising technologies which can be used for connecting, controlling and managing intelligent objects which are connected to Internet through an IP address. Applications ranging from smart governance, smart education, smart agriculture, smart healthcare, smart home etc. can use IoT for effective delivery of services without manual intervention in a more effective manner.



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CHAPTER 5

CONCLUSION AND REFERENCES

5.1 CONCLUSION

In this paper, we are designing an advanced automation system which in turn reduces most of the human interactions, by supporting this system using Internet of Things (IoT). Finally, it is absolutely an affordable system. It can be operated with other options like by using sensors soon, as an extension to this project a system may be developed which warns the user about the excess usage of energy.



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SMART BILLING TROLLEY USING **RFID** AND **ZIGBEE**

A PROJECT REPORT

Submitted by

G.NAGAPRIYA (311816106013)

R.KAVINELAVU (311816106010)

A.AYISHA SITHIKKA (311816106004)

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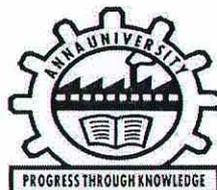
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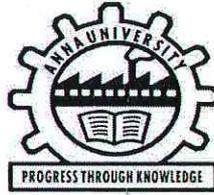
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SEPTEMBER- 2020





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BONAFIDE CERTIFICATE

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Ms. SABITHA BANU K
SUPERVISOR

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Project Viva-Voce held on **22-09-2020**

INTERNAL EXAMINER

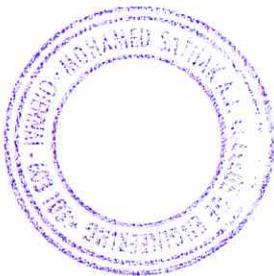
EXTERNAL EXAMINER



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ABSTRACT

A shopping mall or complex is a place where people buy product/s for their regular use. The customers have to wait in long queues to get their products scanned using barcode scanner and get it billed. To get rid of this, we have proposed a new 'Smart Shopping Trolley using **RFID (Radio Frequency Identification)**'. This implementation is used to assist a person while shopping and also to avoid standing in long queues and thus saving time. The smart shopping trolley would consist of a microcontroller, RFID Reader and an Electronic Display. The products in the shopping centers will have RFID tags to retrieve/access information about it. When a customer places a product in the smart trolley, the RFID Reader will read the Product ID and the information related to it will be stored in controller. There will be communication between, main server and billing system (gate system) via **ZigBee module**. The total amount of the products in the trolley will be calculated the Central billing System.



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CHAPTER 6

CONCLUSION

6.1 CONCLUSION

Smart shopping trolley application creates an automated central billing system in malls. By using the **ZigBee**, the product information are directly sent to billing system. So that customer no need to wait in a long queue. It is trustworthy, highly dependable and time efficiency. The proposed smart shopping trolley system will reduce the customers time in searching the location of the product. The customer just typed the name of the product he/she want to purchase on Android device. The trolley will automatically guide them to the location of the product. In future, instead of wasting time in billing section, by using **QR code** to finish our billing at trolley itself

6.2 FUNCTIONAL DESCRIPTION

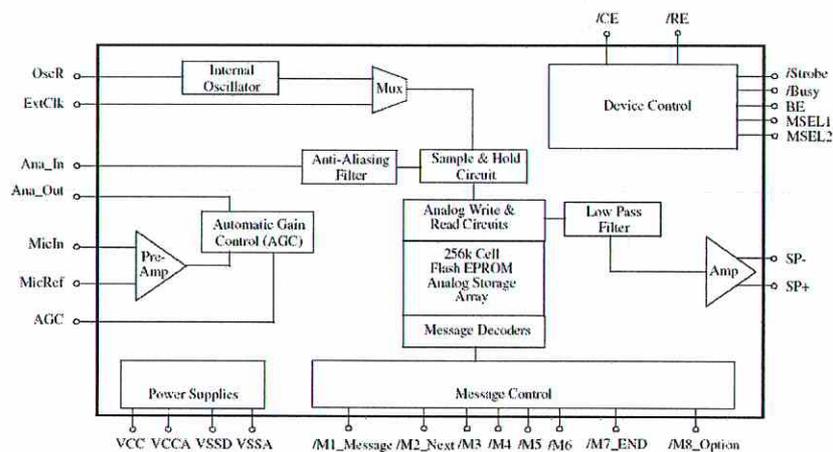
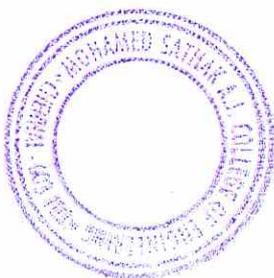


Fig:6.1 APR 9600 block diagram





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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
6	EC6405	Control System Engineering	<ol style="list-style-type: none">1. Control System Modeling:2. Basic Elements Of Control System3. Open Loop And Closed Loop Systems4. Differential equation -Transfer function,5. Modeling of Electric systems6. Translational and rotational mechanical systems7. Block diagram reduction Techniques8. Signal flow graph

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OBJECTIVES:

- To introduce the elements of control system and their modeling using various Techniques.
- To introduce methods for analyzing the time response, the frequency response and the stability of systems
- To introduce the state variable analysis method

UNIT I CONTROL SYSTEM MODELING

9

Basic Elements of Control System – Open loop and Closed loop systems - Differential equation - Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph

UNIT II TIME RESPONSE ANALYSIS

9

Time response analysis - First Order Systems - Impulse and Step Response analysis of second order systems - Steady state errors - P, PI, PD and PID Compensation, Analysis using MATLAB

UNIT III FREQUENCY RESPONSE ANALYSIS

9

Frequency Response - Bode Plot, Polar Plot, Nyquist Plot - Frequency Domain specifications from the plots - Constant M and N Circles - Nichol's Chart - Use of Nichol's Chart in Control System Analysis. Series, Parallel, series-parallel Compensators - Lead, Lag, and Lead Lag Compensators, Analysis using MATLAB.

UNIT IV STABILITY ANALYSIS

9

Stability, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Stability, Dominant Poles, Application of Root Locus Diagram - Nyquist Stability Criterion - Relative Stability, Analysis using MATLAB

UNIT V STATE VARIABLE ANALYSIS

9

State space representation of Continuous Time systems - State equations - Transfer function from State Variable Representation - Solutions of the state equations - Concepts of Controllability and Observability - State space representation for Discrete time systems. Sampled Data control systems – Sampling Theorem - Sampler & Hold - Open loop & Closed loop sampled data systems.

TOTAL: 45 PERIODS**OUTCOMES:****Upon completion of the course, students will be able to:**

- Perform time domain and frequency domain analysis of control systems required for stability analysis.
- Design the compensation technique that can be used to stabilize control systems.

TEXTBOOK:

1. J.Nagrath and M.Gopal, "Control System Engineering", New Age International Publishers, 5th Edition, 2007.

REFERENCES:

1. Benjamin.C.Kuo, "Automatic control systems", Prentice Hall of India, 7th Edition, 1995.
2. M.Gopal, "Control System - Principles and Design", Tata McGraw Hill, 2nd Edition, 2002.
3. Schaum's Outline Series, "Feed back and Control Systems" Tata Mc Graw-Hill, 2007.
4. John J.D'Azzo & Constantine H.Houpis, "Linear Control System Analysis and Design", Tata Mc Graw-Hill, Inc., 1995.
5. Richard C. Dorf and Robert H. Bishop, "Modern Control Systems", Addison - Wesley, 1999.



**DESIGN AND DEVELOPMENT OF DUAL AXIS
CONTROLLED WRITING ROBOT FOR PHYSICALLY
CRIPPLED**

A PROJECT REPORT

Submitted by

S.BADHURUN FARHANA (311816106005)

V.CHANDRAKALA YADAV (311816106006)

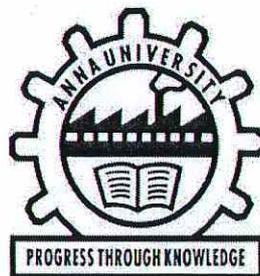
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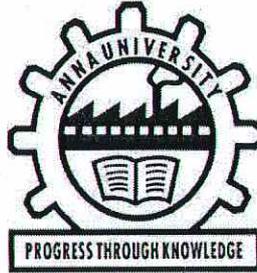


ANNA UNIVERSITY: 600025

SEPTEMBER- 2020



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ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report “**DESIGN AND DEVELOPMENT OF DUAL AXIS CONTROLLED WRITING ROBOT FOR PHYSICALLY CRIPPLED**” is the bonafide work of “**BADHURUN FARHANA S(311816106005), CHANDRAKALA YADAV V (311816106006)** who carried out the project work under my supervision

SIGNATURE

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HEAD OF THE DEPARTMENT

Professor

Electronics and communication

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Project viva- voice held on 22-09-2020

INTERNAL EXAMINER



SIGNATURE

Mrs E JAYANTHI

SUPERVISOR

Associate professor

Electronics and Communication

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EXTERNAL EXAMINER

ABSTRACT

Nowadays people are turning to robots to do their work. Because robots are more versatile, accurate, reliable and reduce human efforts. Artificial Intelligence became the part and parcel of this modern era. Humans are fortunate enough to perform their daily chores. So, we are the “BLESSED CREATURES” But what about physically handicapped people? This is our small contribution for them. “DESIGN AND DEVELOPMENT OF DUAL AXIS CONTROLLED WRITING ROBOT FOR PHYSICALLY CRIPPLED” Obviously it has more efficiency, low cost and has high advantages. The robot is made to write both voice comments and text application in mobile phone. Then the recorded input will be sent to **microcontroller** through **Bluetooth**, a wireless device. The **controller** performs data processing, in which the text is converted into characters by NLP. The word is recognized and output is extracted. Finally, motor action is performed based on voice or text. It is the most useful device for physically handicapped to write the exams by simply recording voice or text. Many industrial applications can be performed using this robot.

Index terms: **ATMEGA 328 P**; **Bluetooth**, *NL Palgorithm, Motor*




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CHAPTER 6

CONCLUSION

The proposed system will be definitely useful for disabled people. The cost is efficient. It is user-friendly and highly compact. Thus, provide good reliability. It provides 90% accuracy. This writing robot can also be used for medical prescription writing for teaching purpose & other industrial application. It has high advantages of using both voice & text format.



A handwritten signature in blue ink, written over a horizontal purple line. The signature is stylized and appears to be 'M. Bathak'.

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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
7	EC6801	Wireless Communication	<ol style="list-style-type: none">1. Wireless Channels: Large scale path loss2. Path loss models: Free Space and Two-Ray models3. Link Budget design –Small scale fading4. Parameters of mobile multipath channels4. Time dispersion parameters-Coherence bandwidth, Doppler spread & Coherence time5. Fading due to Multipath time delay spread – flat fading – frequency selective fading6. Fading due to Doppler spread – fast fading – slow fading.7. Digital Signaling For Fading Channels:8. Structure of a wireless communication link,9. Principles of Offset10. QPSK, p/4-DQPSK11. Minimum Shift Keying, Gaussian12. Minimum Shift Keying

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OBJECTIVES:

The student should be made to:

- Know the characteristic of wireless channel
- Learn the various cellular architectures
- Understand the concepts behind various digital signaling schemes for fading channels
- Be familiar the various multipath mitigation techniques
- Understand the various multiple antenna systems

UNIT I WIRELESS CHANNELS 9

Large scale path loss - Path loss models: Free Space and Two-Ray models -Link Budget design - Small scale fading- Parameters of mobile multipath channels - Time dispersion parameters- Coherence bandwidth - Doppler spread & Coherence time, Fading due to Multipath time delay spread - flat fading - frequency selective fading - Fading due to Doppler spread - fast fading - slow fading.

UNIT II CELLULAR ARCHITECTURE 9

Multiple Access techniques - FDMA, TDMA, CDMA - Capacity calculations-Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade of service - Coverage and capacity improvement.

UNIT III DIGITAL SIGNALING FOR FADING CHANNELS 9

Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle - Cyclic prefix, Windowing, PAPR.

UNIT IV MULTIPATH MITIGATION TECHNIQUES 9

Equalisation - Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity - Micro and Macrodiversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver,

UNIT V MULTIPLE ANTENNA TECHNIQUES 9

MIMO systems - spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels

OUTCOMES:

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

- Characterize wireless channels
- Design and implement various signaling schemes for fading channels
- Design a cellular system
- Compare multipath mitigation techniques and analyze their performance
- Design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance



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Chennai-605 004

TEXTBOOKS:

1. Rappaport, T.S., "Wireless communications", Second Edition, Pearson Education, 2010.
2. Andreas.F. Molisch, "Wireless Communications", John Wiley - India, 2006.





MOHAMED SATHAK A J COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

Siruseri IT Park, Egattur, Chennai - 603 103

S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
8	EC6504	Microprocessor and Microcontroller	<ol style="list-style-type: none">1. I/O Interfacing: Memory Interfacing and I/O interfacing2. Parallel communication interface3. Serial communication interface – D/A and A/D Interface, Timer, Keyboard /display controller4. Interrupt controller, DMA controller5. Programming and applications Case studies: Traffic Light control, LED display, LCD display, Keyboard display interface and Alarm Controller.6. Microcontroller: Architecture of 80517. Special Function Registers(SFRs)8. I/O Pins Ports and Circuits9. Instruction set10. Addressing modes11. Assembly language programming.12. Interfacing Microcontroller: Programming 8051 Timers, Serial Port Programming 17.Interrupts Programming13. LCD & Keyboard Interfacing14. ADC, DAC & Sensor Interfacing15. External Memory Interface16. Stepper Motor and Waveform generation.

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OBJECTIVES:

The student should be made to:

- Study the Architecture of 8086 microprocessor.
- Learn the design aspects of I/O and Memory Interfacing circuits.
- Study about communication and bus interfacing.
- Study the Architecture of 8051 microcontroller.

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 - IO 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.

OUTCOMES:

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

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


TEXT BOOKS:

PRINCIPAL

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

REFERENCE:

1. Douglas V.Hall, "Microprocessors and Interfacing, Programming and Hardware", TMH, 2012



**GHAT ROAD SAFETY MEASUREMENT USING
SMART CAMERA**

A PROJECT REPORT

Submitted by

B.ADARSH DURAIRAJ (311816106701)

S.STEPHIN (311816106022)

N. SYED ANSARI (311816106025)

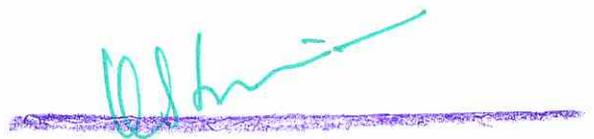
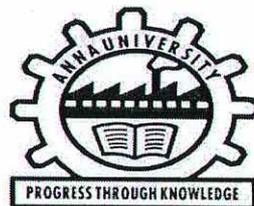
In partial fulfilment for the award of the degree

Of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING



PRINCIPAL

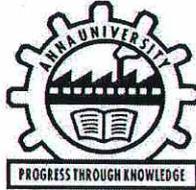
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ANNA UNIVERSITY: CHENNAI 600 025



SEPTEMBER - 2020



ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report “**ROAD SAFETY MEASUREMENT USING SMART CAMERA**” is the bonafide work of “**ADARSH DURAIRAJ B(311816106701)STEPHIN SR (311816106022) ,SYEDANSARI N (311816106025)**” who carried out the project work under my supervision

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Project viva- voice held on 22-09-2020

INTERNAL EXAMINER

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EXTERNAL EXAMINER



ABSTRACT

“Speed Kills”, but still people don’t care enough to act safe while driving on road. Road traffic accidents and deaths caused by them are most critical issues now a days. It is also impacting the country’s economy. It is not safe now days to cross the ghat while having any long journey. Percentage of accident in ghat area is increasing day by day. Severity of this accidents are non-reparable. Road traffic accidents (RTA) are responsible for 1.2 million deaths worldwide each year. So it is first important to control this scenario and have some safety measures in ghat area. In this project we will be designing a smart vehicle alert system for ghat roads where we will be monitoring the vehicles coming across the hairpin bend on both sides and automatically analyze the vehicle type. When the system analyzes the vehicle type it will automatically indicate the smaller vehicle to wait on one side and puts a barrier in front of it with the help of red signal control, while the heavy vehicles can cross it, giving them the priority. This is achieved by using the famous Alex net algorithm in deep learning which proves to be very efficient in deep learning technology. This system can also be implemented in other normal roads also. For implementing this we will be making use of the raspberry pi boards as well as cameras. Thus our project aims at saving the life of the people as well as increasing the safety of the roads.

Keywords: Alex Net, Raspberry pi,



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CHAPTER – 7

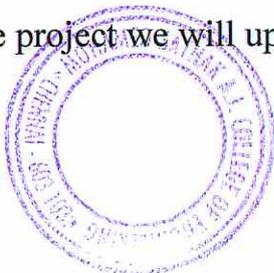
CONCLUSION AND FUTURE WORK

7.1 CONCLUSION

In this project we got to know about the accident which occurs on the road at Ghat section. We understand the causes and effect of accidents and then founded out a solution introducing a new technique to avoid such accident. The new technique consists of two cameras and raspberry pi module which takes images on both sides of the hairpin bend which then compares and decides which priority vehicle should be allowed to pass the road. This help in reducing the accidents and to enjoy the safer ride. Life is important than any other thing, once gone cannot be regained. So, to save this valuable life, this method have important role. It can help Road users at Ghats from being killed in a serious injury. As well as we also analyse the presence of emergency vehicle like ambulance and give it the highest priority by safeguarding once life and is accomplished using signal control of green and red lights on both sides. Thus our project plays an important role in saving the life of the people and promoting safe road system.

7.2 FUTURE WORK

Our project is a real time applicable project which can be implemented in all the ghat roads in their hairpin bend areas and promote supporting road safety system. This project is suitable not only for ghat roads but also for normal roads wherever sharp bends comes allowing the priority vehicle to cross the path first. In future the prediction of all kind of emergency vehicles can be done as well as promote the establishment of this system in all the areas where roads are prone to accidents frequently to promote an accident free road system. If much more accurate algorithms gets discovered in deep learning approach which is the key technology used in the project we will upgrade the system with more accurate performance.





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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
9	EC6602	Antenna and wave propagation	<ol style="list-style-type: none">1. Fundamentals Of Radiation: Definition of antenna parameters – Gain, Directivity, Effective aperture, Radiation Resistance, Band width, Beam width, Input Impedance.2. Matching – Baluns, Polarization mismatch,3. Antenna noise temperature,4. Radiation from oscillating dipole5. Half wave dipole. Folded dipole6. Yagi array, Special Antennas: Principle of frequency independent antennas, Spiral antenna, Helical antenna, Log periodic. Modern antennas7. Reconfigurable antenna, Active antenna, Dielectric antennas.8. Electronic band gap structure and applications,9. Antenna Measurements-Test Ranges, Measurement of Gain, Radiation pattern, Polarization, VSWR10. Propagation of Radio Waves: Modes of propagation11. Structure of atmosphere12. Ground wave propagation, Troposphere propagation, Duct propagation, Troposcatter propagation13. Flat earth and Curved earth concept Sky wave propagation14. Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, Multi hop propagation

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OBJECTIVES:

- To give insight of the radiation phenomena.
- To give a thorough understanding of the radiation characteristics of different types of antennas
- To create awareness about the different types of propagation of radio waves at different frequencies

UNIT I FUNDAMENTALS OF RADIATION

9

Definition of antenna parameters - Gain, Directivity, Effective aperture, Radiation Resistance, Band width, Beam width, Input Impedance. Matching – Baluns, Polarization mismatch, Antenna noise temperature, Radiation from oscillating dipole, Half wave dipole. Folded dipole, Yagi array.

UNIT II APERTURE AND SLOT ANTENNAS

9

Radiation from rectangular apertures, Uniform and Tapered aperture, Horn antenna, Reflector antenna, Aperture blockage, Feeding structures, Slot antennas, Microstrip antennas – Radiation mechanism – Application, Numerical tool for antenna analysis

UNIT III ANTENNA ARRAYS

9

N element linear array, Pattern multiplication, Broadside and End fire array – Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array

UNIT IV SPECIAL ANTENNAS

9

Principle of frequency independent antennas -Spiral antenna, Helical antenna, Log periodic. Modern antennas- Reconfigurable antenna, Active antenna, Dielectric antennas, Electronic band gap structure and applications, Antenna Measurements-Test Ranges, Measurement of Gain, Radiation pattern, Polarization, VSWR

UNIT V PROPAGATION OF RADIO WAVES

9

Modes of propagation, Structure of atmosphere, Ground wave propagation, Tropospheric propagation, Duct propagation, Troposcatter propagation, Flat earth and Curved earth concept Sky wave propagation – Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, Multi hop propagation

TOTAL: 45 PERIODS**OUTCOMES:**

Upon completion of the course, students will be able to:

- Explain the various types of antennas and wave propagation.
- Write about the radiation from a current element.
- Analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad band

TEXT BOOK:

1. John D Kraus, "Antennas for all Applications", 3rd Edition, Mc Graw Hill, 2005.

REFERENCES:

1. Edward C.Jordan and Keith G.Balmain "Electromagnetic Waves and Radiating Systems" Prentice Hall of India, 2006
2. R.E.Collin, "Antennas and Radiowave Propagation", Mc Graw Hill 1985.
3. Constantine.A.Balanis "Antenna Theory Analysis and Design", Wiley Student Edition, 2006.
4. Rajeswari Chatterjee, "Antenna Theory and Practice" Revised Second Edition New Age International Publishers, 2006.



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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
10	EC6701	RF and Microwave Engineering	<ol style="list-style-type: none">1. RF Amplifiers: Characteristics of Amplifiers2. Amplifier power relations3. Stability considerations. Stabilization Methods, Noise Figure, Constant VSWR, Broadband, High power and Multistage Amplifiers9. Passive and Active Microwave Devices: Terminations, Attenuators, Phase shifters, Directional couplers, Hybrid Junctions, Power dividers, Circulator, Isolator10. Impedance matching devices: Tuning screw Stub and quarter wave transformers.11. Crystal and Schottkey diode detector and mixers, PIN diode switch, Gunn diode oscillator12. IMPATT diode oscillator and amplifier13. Varactor diode, Introduction to MIC.14. Microwave Generation: Review of conventional vacuum Triodes, Tetrodes and Pentodes15. High frequency effects in vacuum Tubes16. Theory and application of Two cavity Klystron Amplifier17. Reflex Klystron oscillator, Traveling wave tube amplifier18. Magnetron oscillator using Cylindrical, Linear, Coaxial Voltage tunable Magnetrons, Backward wave Crossed field amplifier and oscillator

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OBJECTIVES:

- To inculcate understanding of the basics required for circuit representation of RF networks.
- To deal with the issues in the design of microwave amplifier.
- To instill knowledge on the properties of various microwave components.
- To deal with the microwave generation and microwave measurement techniques

UNIT I TWO PORT NETWORK THEORY

9

Review of Low frequency parameters: Impedance, Admittance, Hybrid and ABCD parameters, Different types of interconnection of Two port networks, High Frequency parameters, Formulation of S parameters, Properties of S parameters, Reciprocal and lossless Network, Transmission matrix, RF behavior of Resistors, Capacitors and Inductors.

UNIT II RF AMPLIFIERS AND MATCHING NETWORKS

9

Characteristics of Amplifiers, Amplifier power relations, Stability considerations, Stabilization Methods, Noise Figure, Constant VSWR, Broadband, High power and Multistage Amplifiers, Impedancematching using discrete components, Two component matching Networks, Frequency response and quality factor, T and Pi Matching Networks, Microstrip Line Matching Networks.

UNIT III PASSIVE AND ACTIVE MICROWAVE DEVICES

9

Terminations, Attenuators, Phase shifters, Directional couplers, Hybrid Junctions, Power dividers, Circulator, Isolator, Impedance matching devices: Tuning screw, Stub and quarter wave transformers. Crystal and Schottkey diode detector and mixers, PIN diode switch, Gunn diode oscillator, IMPATT diode oscillator and amplifier, Varactor diode, Introduction to MIC.

UNIT IV MICROWAVE GENERATION

9

Review of conventional vacuum Triodes, Tetrodes and Pentodes, High frequency effects in vacuum Tubes, Theory and application of Two cavity Klystron Amplifier, Reflex Klystron oscillator, Traveling wave tube amplifier, Magnetron oscillator using Cylindrical, Linear, Coaxial Voltage tunable Magnetrons, Backward wave Crossed field amplifier and oscillator.

UNIT V MICROWAVE MEASUREMENTS

9

Measuring Instruments : Principle of operation and application of VSWR meter, Power meter, Spectrum analyzer, Network analyzer, Measurement of Impedance, Frequency, Power, VSWR, Q- factor, Dielectric constant, Scattering coefficients, Attenuation, S-parameters.

OUTCOMES:

Upon completion of the course, students will be able to:

- Explain the active & passive microwave devices & components used in Microwave communication systems.
- Analyze the multi- port RF networks and RF transistor amplifiers.
- Generate Microwave signals and design microwave amplifiers.
- Measure and analyze Microwave signal and parameters.

TEXT BOOKS:

1. Reinhold Ludwig and Gene Bogdanov, "RF Circuit Design: Theory and Applications", Pearson Education Inc., 2011
2. Robert E Colin, "Foundations for Microwave Engineering", John Wiley & Sons Inc, 2005

REFERENCES:

1. David M. Pozar, "Microwave Engineering", Wiley India (P) Ltd, New Delhi, 2008.
2. Thomas H Lee, "Planar Microwave Engineering: A Practical Guide to Theory, Measurements and



**BRAIN TUMOR DETECTION IN MICROWAVE
IMAGING SYSTEM BY USING EBG BASED
MICROSTRIP PATCH ANTENNA**

A PROJECT REPORT

Submitted by

MOHAMED THANSEER.A

(Reg.no:311816106702)

SUDHARSHAN.S

(Reg.no:311816106024)

In partial fulfilment for the award of the degree

Of

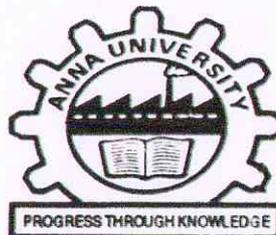
BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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APRIL 2020



ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**BRAIN TUMOR DETECTION IN MICROWAVE IMAGING SYSTEM USING EBG BASED MICROSTRIP PATCH ANTENNA**" is the bona fide work of "**A.MOHAMED THANSEER (311816106702), S.SUDHARSHAN(311816106024)**" who carried out the project work under my supervision.



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Dr. E.DHIRAVIDACHELVI

HEAD OF THE DEPARTMENT

Associate Professor

Department of ECE

Mohammed Sathak AJ

College Of Engineering,

Egattur, Chennai-603103



SIGNATURE

Mr .J.RAJA

SUPERVISOR

Assistant Professor

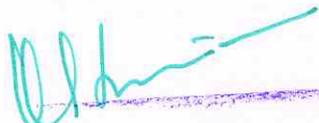
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Project Viva-Voce held on 22-09-2020



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INTERNAL EXAMINER

EXTERNAL EXAMINER



ABSTRACT

Microwave imaging system plays a vital rule in medical field for detecting and identifying various diseases through microwave imaging techniques. In these scattering parameter image are used to diagnose various diseases like brain tumor, cardio vascular, ect. In this paper we proposed to a compact and efficient micro strip patch antenna is used in the imaging technique to transmit equivalent signal and receive the backscattering signal from stratified human head model



A handwritten signature in blue ink, appearing to be "W. J. Sathish", written over a horizontal purple line.

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Conclusion

The Brain Tumor Analysis using **micro strip patch antenna** is used for detecting the tumors, the various shapes of the antenna can be used to identify the effective detection methods, the various shapes are like Dwell shape, Circular Shape, S Shaped and U Shape antennas are used for this **brain tumor detections** from the shapes S Shaped Antenna got better results for Tumor Detections

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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
11	EC6201	Electronic devices	<ol style="list-style-type: none">1. Semiconductor Diode2. PN junction diode, Current equations, Diffusion and drift current densities3. Forward and reverse bias characteristics, Switching Characteristics4. Power Devices And Display Devices: UJT, SCR, DIAC, TRIAC5. Power BJT- Power MOSFET6. DMOS-VMOS7. LED8. LCD9. Photo transistor10. Opto Coupler11. Solar cell12. CCD

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OBJECTIVES:

The student should be made to:

- Be exposed to basic electronic devices
- Be familiar with the theory, construction, and operation of Basic electronic devices.

UNIT I SEMICONDUCTOR DIODE

9

PN junction diode, Current equations, Diffusion and drift current densities, forward and reverse bias characteristics, Switching Characteristics.

UNIT II BIPOLAR JUNCTIONS

NPN -PNP -Junctions-Early effect-Current equations – Input and Output characteristics of CE, CB CC-Hybrid - π model - h-parameter model, Ebers Moll Model- Gummel Poon-model, Multi Emitter Transistor.

UNIT III FIELD EFFECT TRANSISTORS

9

JFETs - Drain and Transfer characteristics,-Current equations-Pinch off voltage and its significance-MOSFET- Characteristics- Threshold voltage -Channel length modulation, D-MOSFET, E-MOSFET- ,Current equation - Equivalent circuit model and its parameters, FINFET,DUAL GATE MOSFET.

UNIT IV SPECIAL SEMICONDUCTOR DEVICES

9

Metal-Semiconductor Junction- MESFET, Schottky barrier diode-Zener diode-Varactor diode -Tunnel diode- Gallium Arsenide device, LASER diode, LDR.

UNIT V POWER DEVICES AND DISPLAY DEVICES

9

UJT, SCR, Diac, Triac, Power BJT- Power MOSFET- DMOS-VMOS. LED, LCD, Photo transistor, Opto Coupler, Solar cell, CCD.

TOTAL: 45 PERIODS**OUTCOMES:**

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

- Explain the theory, construction, and operation of basic electronic devices.
- Use the basic electronic devices

TEXT BOOKS

1. Donald A Neaman, "Semiconductor Physics and Devices", Third Edition, Tata Mc GrawHill Inc. 2007.

REFERENCES:

1. Yang, "Fundamentals of Semiconductor devices", McGraw Hill International Edition, 1978.
2. Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory" Pearson Prentice Hall, 10th edition, July 2008.



GAS LEVEL MONITORING AND LEAKAGE DETECTION USING IOT

A PROJECT REPORT

Submitted by

M.FAYAS AHAMED (311816106008)

J.MOHAMMED SHADHIR (311816106012)

K.SANTHOSH KUMAR (311816106020)

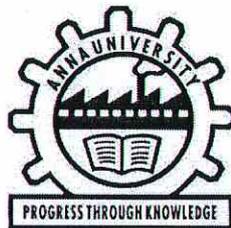
In partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

In

ELECTRONICS AND COMMUNICATION ENGINEERING



PRINCIPAL

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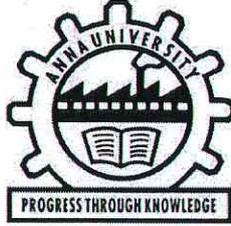
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SEPTEMBER- 2020



AFFILIATED TO ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report "**GAS LEVEL MONITORING AND LEAKAGE DETECTION USING IOT**" is the bonafide work of "M.FAYAS AHAMED (311816106008), J MOHAMMED SHADHIR (311816106012), K SANTHOSH KUMAR (311816106020)" who carried out the project work under my supervision.

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Professor and Head

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Submitted for Semester Examination held on: 22-09-2020

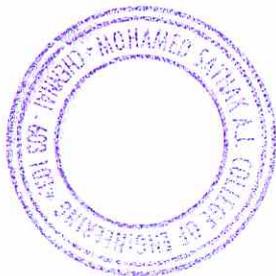
INTERNAL EXAMINER

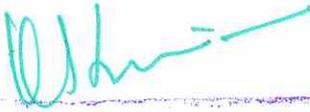


EXTERNAL EXAMINER

ABSTRACT

LPG is mainly used for cooking commercially as well as by consumers in many countries for economic reasons, for convenience or because it is the preferred fuel source. This paper focuses on the application of the IOT which is used for measuring and displaying the gasoline content present in household LPG cylinder and this is helpful in finding the amount of LPG left in the cylinder and also can be used to detect any illegal activities and also detect the gas leakage. The level of LPG is measured using load sensor (SEN-10245). The output of the sensor is connected with NodeMCU (ESP 8266).By using the same we can also send alerts to the mobile through the Blynk application. The gas leakage is detected by gas sensor (MQ-135). By using this, we can detect the current LPG level and it is continuously displayed on the IOT cloud. We can know the validity of LPG usage from the date of initialization. Then by detecting the gas leakage we can prevent the LPG gas burst accidents in the home.




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CHAPTER 5

CONCLUSION AND REFERENCES

5.1 CONCLUSION

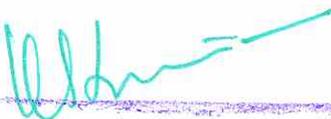
This paper consists of two sections transmitter section and receiver section. In this the level of the cylinder can be viewed by the agency through the IOT cloud.

With the assistance of the gas detector device and also the gas leak. And at last with the application of **IoT**, the level of gas can be viewed over the IOT cloud. Using this system, the users can be aware of their gas level and it also avoids the prior and delay booking of the cylinder.

And also the components used here are commercially cheap when compared to other **gas detectors**. Hence this concept can also be widely used in the industries according to their requirements.

The user also get notified when there is a gas leak with the help of the gas sensor (mq-135) via esp8266 and can avoid accidental explosions.




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Siruseri IT Park, Egattur, Chennai - 603 103

S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
12	EC8252	Electronic Devices	<ol style="list-style-type: none">1. Semiconductor Diode2. PN junction diode, Current equations, Diffusion and drift current densities3. Forward and reverse bias characteristic4. Transition and diffusion capacitances5. Switching Characteristics, Breakdown in PN junction diodes6. Power Devices And Display Devices: UJT, SCR, DIAC, TRIAC7. Power BJT- Power MOSFET8. DMOS-VMOS9. LED10. LCD11. Photo transistor12. Opto Coupler13. Solar cell14. CCD

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Chennai-603 103.

OBJECTIVES:

- To acquaint the students with the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices

UNIT I SEMICONDUCTOR DIODE 9

PN junction diode, Current equations, Energy Band diagram, Diffusion and drift current densities, forward and reverse bias characteristics, Transition and Diffusion Capacitances, Switching Characteristics, Breakdown in PN Junction Diodes.

UNIT II BIPOLAR JUNCTION TRANSISTORS 9

NPN -PNP -Operations-Early effect-Current equations - Input and Output characteristics of CE, CB, CC - Hybrid - π model - h-parameter model, Ebers Moll Model- Gummel Poon-model, Multi Emitter Transistor.

UNIT III FIELD EFFECT TRANSISTORS 9

JFETs - Drain and Transfer characteristics,-Current equations-Pinch off voltage and its significance- MOSFET- Characteristics- Threshold voltage -Channel length modulation, D-MOSFET, E-MOSFET- Characteristics - Comparison of MOSFET with JFET.

UNIT IV SPECIAL SEMICONDUCTOR DEVICES 9

Metal-Semiconductor Junction- MESFET, FINFET, PINFET, CNTFET, DUAL GATE MOSFET, Schottky barrier diode-Zener diode-Varactor diode -Tunnel diode- Gallium Arsenide device, LASER diode, LDR.

UNIT V POWER DEVICES AND DISPLAY DEVICES 9

UJT, SCR, Diac, Triac, Power BJT- Power MOSFET- DMOS-VMOS. LED, LCD, Photo transistor, Opto Coupler, Solar cell, CCD.

TOTAL : 45 PERIODS**OUTCOMES:**

At the end of the course the students will be able to:

- Explain the V-I characteristic of diode, UJT and SCR
- Describe the equivalence circuits of transistors
- Operate the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices

TEXT BOOKS:

- Donald A Neaman, "Semiconductor Physics and Devices", Fourth Edition, Tata Mc GrawHill Inc. 2012.
- Salivahanan. S, Suresh Kumar. N, Vallavaraj.A, "Electronic Devices and circuits", Third Edition, Tata McGraw- Hill, 2008.

REFERENCES:

- Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory" Pearson Prentice Hall, 10th edition, July 2008.
- R.S.Sedha, "A Text Book of Applied Electronics" S.Chand Publications, 2006.
- Yang, "Fundamentals of Semiconductor devices", McGraw Hill International Edition, 1978.


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34

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07.01.2020

CERTIFICATE OF IN-PLANT TRAINING

This is to certify that Mr. **SUBASH G** student of **MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING** has undergone In-Plant Training in Manufacturing Operations for the period from **10-12-2019** to **24-12-2019**.

He has displayed professional acumen during the period of In-plant Training and we appreciate his interest for learning.

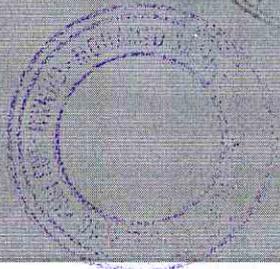
We wish him all success in his future endeavors.

For Lenovo (India) Pvt. Ltd.

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Engineering
Srinivas Road (GMR), Siruseri, D Park
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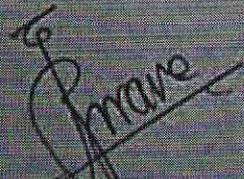
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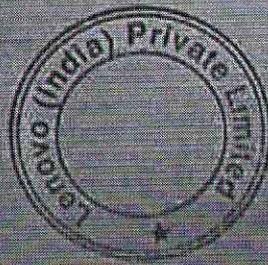
This is to certify that Mr. **KARAN J** student of **MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING** has undergone In-Plant Training in Manufacturing Operations for the period from **10-12-2019** to **24-12-2019**.

He has displayed professional acumen during the period of In-plant Training and we appreciate his interest for learning.

We wish him all success in his future endeavors.

For Lenovo (India) Pvt. Ltd.


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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
13	EC8392	Digital Electronics	<ol style="list-style-type: none">1. Digital integrated circuits: Logic levels2. Propagation delay,3. Power dissipation4. Fan-out and fan-in, noise margin,5. Logic families and their characteristics - RTL, TTL, ECL, CMOS

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OBJECTIVES:

- To present the Digital fundamentals, Boolean algebra and its applications in digital systems
- To familiarize with the design of various combinational digital circuits using logic gates
- To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits
- To explain the various semiconductor memories and related technology
- To introduce the electronic circuits involved in the making of logic gates

UNIT I DIGITAL FUNDAMENTALS 9

Number Systems - Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Codes - Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization.

UNIT II COMBINATIONAL CIRCUIT DESIGN 9

Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder - Carry look ahead Adder, BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.

UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS 9

Flip flops - SR, JK, T, D, Master/Slave FF - operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits - Design - Moore/Mealy models, state minimization, state assignment, circuit implementation - Design of Counters- Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS 9

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits.

UNIT V MEMORY DEVICES AND DIGITAL INTEGRATED CIRCUITS 9

Basic memory structure - ROM - PROM - EPROM - EEPROM - EAPROM, RAM - Static and dynamic RAM - Programmable Logic Devices - Programmable Logic Array (PLA) - Programmable Array Logic (PAL) - Field Programmable Gate Arrays (FPGA) - Implementation of combinational logic circuits using PLA, PAL.

Digital integrated circuits: Logic levels, propagation delay, power dissipation, fan-out and fan-in, noise margin, logic families and their characteristics-RTL, TTL, ECL, CMOS

TOTAL: 45 PERIODS**OUTCOMES:****At the end of the course:**

- Use digital electronics in the present contemporary world
- Design various combinational digital circuits using logic gates
- Do the analysis and design procedures for synchronous and asynchronous sequential circuits
- Use the semiconductor memories and related technology
- Use electronic circuits involved in the design of logic gates

TEXT BOOK:

1. M. Morris Mano and Michael D. Ciletti, "Digital Design", 5th Edition, Pearson, 2014.

REFERENCES:

1. Charles H. Roth, "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013.
2. Thomas L. Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011
3. S. Salivahanan and S. Arivazhagan "Digital Electronics", 1st Edition, Vikas Publishing House pvt Ltd, 2012.
4. Anil K. Maini "Digital Electronics", Wiley, 2014.
5. A. Anand Kumar "Fundamentals of Digital Circuits", 4th Edition, PHI Learning Private Limited, 2016.
6. Soumitra Kumar Mandal "Digital Electronics", McGraw Hill Education Private Limited, 2016.



PRINCIPAL

MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

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Chennai-600 109.

30th April 2020

INTERN COMPLETION CERTIFICATE

This is to certify that Mr. G. SUBASH (Reg. No. 311817106010) a student of BE.,(Electronics and Communication Engineering) Mohamed Sathak A J College Of Engineering - Chennai has successfully completed the Internship in JAVA platform from February 2020 to April 2020 in our company. During the period, He had been exposed to different processes and found to be Punctual, Hard Working and Inquisitive.

We wish him every success in life and career.

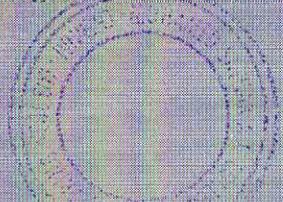
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Vishnu S

Asst. Manager-Admin & Human Resources

A handwritten signature in green ink, appearing to be "Vishnu S", written over a faint horizontal line.



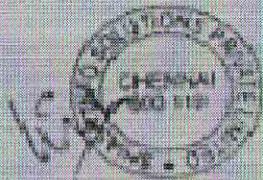
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30th April 2020

INTERN COMPLETION CERTIFICATE

This is to certify that **Mr. C. RAJ KUMAR** (Reg. No. 311017106-008) a student of **B.E. (Electronics and Communication Engineering) Mohamed Sathak A J College Of Engineering - Chennai** has successfully completed the Internship in **JAVA** platform from **February 2020 to April 2020** in our company. During the period, He had been exposed to different processes and found to be **Punctual, Hard Working and Inquisitive**.
We wish him every success in life and career.

For Shiash Info Solutions Private Limited



Vishnu S

Asst. Manager-Admin & Human Resources

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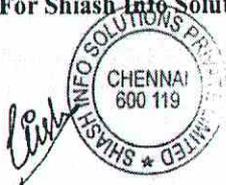
30th April 2020

INTERN COMPLETION CERTIFICATE

This is to certify that **Mr. U. R. HAMEED ZIYATH (Reg. No. 311817106002)** a student of **B.E.,(Electronics and Communication Engineering) Mohamed Sathak A J College Of Engineering - Chennai** has successfully completed the Internship in **JAVA** platform from **February 2020 to April 2020** in our company. During the period, He had been exposed to different processes and found to be Punctual, Hard Working and Inquisitive.

We wish him every success in life and career.

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Asst. Manager-Admin & Human Resources



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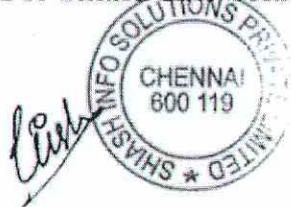
30th April 2020

INTERN COMPLETION CERTIFICATE

This is to certify that **Mr. J. KARAN** (Reg. No. 311817106003) a student of **B.E.,(Electronics and Communication Engineering)** **Mohamed Sathak A J College Of Engineering - Chennai** has successfully completed the Internship in **JAVA** platform from **February 2020 to April 2020** in our company. During the period, He had been exposed to different processes and found to be **Punctual, Hard Working and Inquisitive.**

We wish him every success in life and career.

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Asst. Manager-Admin & Human Resources

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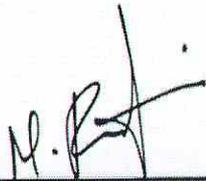
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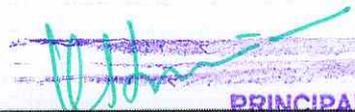
CERTIFICATE OF MERIT

This is to certify that M. MOHAMED ABDUL BRAHMAN (Reg No. 311817106004) has
successfully completed the internship in EMBEDDED Application Development in our
concern from 07. 12. 2019 to 06. 01. 2020.

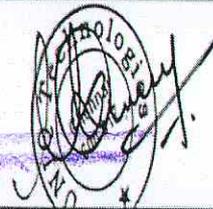
During the internship period, the performance of the intern was found to be GOOD.



Program Coordinator



PRINCIPAL



HR Head





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Siruseri IT Park, Egattur, Chennai - 603 103

S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
14	EC8453	Linear integrated circuits	<ol style="list-style-type: none">1. Basics of Operational amplifier: Current mirror and current sources.2. Current sources as active loads.3. Voltage sources, Voltage References4. BJT Differential amplifier with active loads5. Basic information about op-amps6. Ideal Operational Amplifier - General operational amplifier stages and internal circuit diagrams of IC 7417. DC and AC performance characteristics, slew rate, Open and closed loop configurations8. JFET Operational Amplifiers- LF155 and TL082.8. Applications Of Operational amplifiers: Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters.9. Adder, subtractor, Instrumentation amplifier,10. Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier,11. Comparators, Schmitt trigger, Precision rectifier, peak detector, Clipper and clamper12. Low-pass, high-pass and band-pass Butterworth filters

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OBJECTIVES:

- To introduce the basic building blocks of linear integrated circuits
- To learn the linear and non-linear applications of operational amplifiers
- To introduce the theory and applications of analog multipliers and PLL
- To learn the theory of ADC and DAC
- To introduce the concepts of waveform generation and introduce some special function ICs

UNIT I BASICS OF OPERATIONAL AMPLIFIERS 9

Current mirror and current sources, Current sources as active loads, Voltage sources, Voltage References, BJT Differential amplifier with active loads, Basic information about op-amps - Ideal Operational Amplifier - General operational amplifier stages -and internal circuit diagrams of IC 741, DC and AC performance characteristics, slew rate, Open and closed loop configurations - JFET Operational Amplifiers - LF155 and TL082.

UNIT II APPLICATIONS OF OPERATIONAL AMPLIFIERS 9

Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters.

UNIT III ANALOG MULTIPLIER AND PLL 9

Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell - Variable transconductance technique, analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation and Frequency synthesizing and clock synchronisation.

UNIT IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS 9

Analog and Digital Data Conversions, D/A converter - specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R - 2R Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters - specifications - Flash type - Successive Approximation type - Single Slope type - Dual Slope type - A/D Converter using Voltage-to-Time Conversion - Over-sampling A/D Converters, Sigma - Delta converters.

UNIT V WAVEFORM GENERATORS AND SPECIAL FUNCTION ICs 9

Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators - Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator, Low Drop - Out(LDO) Regulators - Switched capacitor filter IC MF10, Frequency to Voltage and Voltage to Frequency converters, Audio Power amplifier, Video Amplifier, Isolation Amplifier, Opto-couplers and fibre optic IC.

TOTAL:45 PERIODS**OUTCOMES:**


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Upon completion of the course, the student should be able to:

- Design linear and non linear applications of OP - AMPS
- Design applications using analog multiplier and PLL
- Design ADC and DAC using OP - AMPS
- Generate waveforms using OP - AMP Circuits
- Analyze special function ICs

TEXT BOOKS:

1. D.Roy Choudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd., 2018, Fifth Edition. (Unit I - V)
2. Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", 4th Edition, Tata Mc Graw-Hill, 2016 (Unit I - V)

REFERENCES:

1. Ramakant A. Gayakwad, "OP-AMP and Linear ICs", 4th Edition, Prentice Hall / Pearson Education, 2015.
2. Robert F.Coughlin, Frederick F.Driscoll, "Operational Amplifiers and Linear Integrated Circuits", Sixth Edition, PHI, 2001.
3. B.S.Sonde, "System design using Integrated Circuits", 2nd Edition, New Age Pub, 2001.
4. Gray and Meyer, "Analysis and Design of Analog Integrated Circuits", Wiley International, 5th Edition, 2009.
5. William D.Stanley, "Operational Amplifiers with Linear Integrated Circuits", Pearson Education, 4th Edition, 2001.
6. S.Salivahanan & V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", TMH, 2nd Edition, 4th Reprint, 2016.



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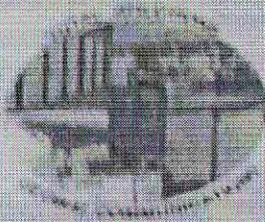
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Bangalore-560016



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This is to certify that

Mr. M Mohamed Abdul Rahiman

BE (Electronics & Communication)
of

Mohamed Sathak A.J. College of Engineering – Chennai
has successfully completed

Internship

During the period from 10/06/2019 to 22/06/2019

In the following areas

Telephones Defence Productions, Switching Access Products,
Research & Development, Information Technology, Quality Assurance & IOT



M. Mohamed Abdul Rahiman

Signature of the
Trainee

Date: 22/06/2019

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Mohamed Sathak A.J. COLLEGE OF ENGINEERING
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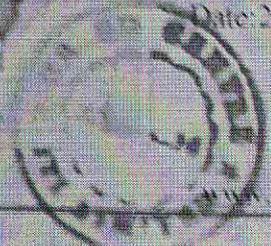
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Dy. Manager HRED

Dy. Manager-HRED
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ITI Limited Dooravan Nagar

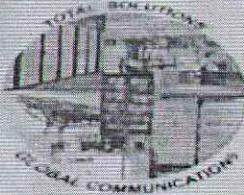
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Bangalore-560016



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*BE (Electronics & Communication)
of*

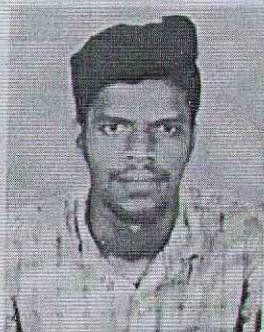
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has successfully completed*

Internship

During the period from 10/06/2019 to 22/06/2019

In the following areas

*Telephones Defence Productions, Switching Access Products,
Research & Development, Information Technology, Quality Assurance & IOT*



G. Subash
Signature of the

Trainee: **M. SATHAK A.J. COLLEGE OF ENGINEERING**
Date: 22/06/2019
Gandhi Road (DSE), Street
Chennai-600 103.

PRINCIPAL

Issuing Authority
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Dy. Manager-HRED
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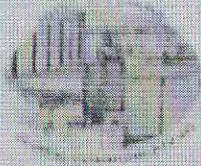
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Bangalore-560016

HUMAN RESOURCES - EMPLOYEE DEVELOPMENT CENTRE

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This is to certify that

Mr. C. RAJKUMAR

BE (Electronics & Communication)

of

Mohamed Sathak A.J. College of Engineering - Chennai
has successfully completed

Internship

During the period from 10/06/2019 to 22/06/2019

In the following areas

Telephones Defence Productions, Switching, Access Products,
Research & Development, Information Technology, Quality Assurance & IOT



C. Raj Kumar
Signature of the

Trainee NAME: SATHAK A.J. COLLEGE OF ENGINEERING
Date: 22/06/2019

PRINCIPAL, Issuing Authority
Dy. Manager HRD

Dr. M. SURESH KUMAR
(Ravi Suresh Yadav)
ITI Limited Dooravaninagar
Bangalore - 560016





MOHAMED SATHAK A J COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

Siruseri IT Park, Egattur, Chennai - 603 103

S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
15	EC8791	Embedded and Real Time systems	<ol style="list-style-type: none">1. ARM Processor and Peripherals: ARM Architecture Versions2. ARM Architecture3. Instruction Set – Stacks and Subroutines4. Features of the LPC 214X Family Peripherals5. The Timer Unit, Pulse Width Modulation Unit6. UART – Block Diagram of ARM9 and ARM Cortex M3 MCU.7. Real Time Systems: Structure of a Real Time System, Estimating program run times8. Task Assignment and Scheduling9. Fault Tolerance Techniques – Reliability10. Evaluation – Clock Synchronization

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EC8791

EMBEDDED AND REAL TIME SYSTEMS

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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:



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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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(Manufacturer of Automobile Components, all kinds of Jigs, Fixture, Controls & Automation
panels, Customized Electronic Devices and Software Development)

GST IN: 33CSCPM6329L1ZI.

Contact: 95855 44555, 99622 95557. E-mail id: marutitechchennai@gmail.com

Web site: www.marutitech.co.in

DATE: 16.12.2019

CERTIFICATE OF INTERNSHIP

This is to certify that Ms. SANDHIYA ROSELIN MARY N V, 3rd year student of Electronics and Communication Engineering, Mohamed Sathak A.J College of Engineering, Egattur-603103, has successfully completed her Internship at MARUTI TECH from 15-11-2019 to 14-12-2019 on Industrial Based Embedded System Development. During the period of her internship program she was found to be sincere, hardworking and inquisitive. We wish her every success in her life and career.

Regards

G. Narayanan

Authorized Signatory
(MARUTI TECH)



(Handwritten signature in blue ink)

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Company address: No: 4/513, Bhavani amman Koil st, Akash Nagar, Manimedu,
83Thandalam, Chennai- 600 128.



TO WHOMSO EVER IT MAY CONCERN

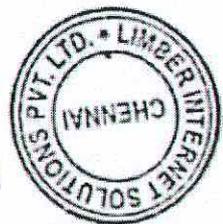
This is to certify that **KARAN J** student of **MOHAMED SATHAK AJ COLLEGE OF ENGINEERING BE/ECE** has undergone the internship in our concern entitled **INTERNET OF THINGS AND DIGITAL MARKETING** from **19 June 2019 to 29 June 2019** in relevant department related to their academic studies.

During the above period, the performance was good and we wish great success in all your future endeavours



Authorized Signatory

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Office Seal

Dhiwakaran R
(Founder)



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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
16	EC8691	Microprocessors and Microcontrollers	<ol style="list-style-type: none">1. I/O Interfacing: Memory Interfacing and I/O interfacing, Parallel communication interface2. Serial communication interface – D/A and A/D Interface3. Timer – Keyboard /display controller – Interrupt controller, DMA controller4. Programming and applications Case studies: Traffic Light control, LED display , LCD display,5. Keyboard display interface and Alarm Controller6. Microcontroller: Architecture of 8051, Special Function Registers (SFRs), I/O Pins Ports and Circuits, Instruction set, Addressing modes7. Assembly language programming.8. Interfacing Microcontroller: Programming 8051 Timers, Serial Port Programming9. Interrupts Programming – LCD & Keyboard Interfacing, ADC, DAC & Sensor Interfacing, External Memory Interface10. Stepper Motor and Waveform generation11. Comparison of Microprocessor, Microcontroller, PIC and ARM processors.

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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" 3rd edition, Tata McGrawHill, 2012



TO WHOM SO EVER IT MAY CONCERN

This is to certify that MOHAMED SHAFIQ SHARRIFF G student of MOHAMED SATHAK AJ COLLEGE OF ENGINEERING BE/ECE has undergone the Internship in our concern entitled INTERNET OF THINGS AND DIGITAL MARKETING from 19 June 2019 to 29 June 2019 in relevant department related to their academic studies.

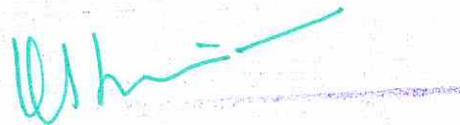
During the above period, the performance was good and we wish great success in all your future endeavours

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S.No.	Subject Code	Subject Name	Content that include Experimental Learning Through Project Work
17	EC8551	Communication Networks	<ol style="list-style-type: none">1. Fundamentals & Link Layer: Overview of Data Communications, Networks – Building Network and its types, Overview of Internet - Protocol Layering2. OSI Mode – Physical Layer - Overview of Data and Signals -introduction to Data Link Layer, Link layer Addressing- Error Detection and Correction.3. Media Access & Internetworking: Overview of Data link Control and Media access control4. Ethernet (802.3), Wireless LANs –Available Protocols – Bluetooth – Bluetooth Low Energy – WiFi – Low PAN – Zigbee, Network layer services – Packet Switching – IPV4 Address – Network layer protocols (IP, ICMP, Mobile IP)5. Transport Layer: Introduction to Transport layer Protocols- User Datagram Protocols (UDP) and Transmission Control Protocols (TCP) –Services – Features – TCP Connection – State Transition Diagram –Flow, Error and Congestion Control - Congestion avoidance (DECbit, RED)6. QoS – Application requirements, Application Layer: Application Layer Paradigms7. Client Server Programming – World Wide Web and HTTP - DNS- -Electronic Mail (SMTP, POP3, IMAP, MIME)8. Introduction to Peer to Peer Networks – Need for Cryptography and Network Security – Firewalls.

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OBJECTIVES:

The student should be made to:

- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

UNIT I FUNDAMENTALS & LINK LAYER 9

Overview of Data Communications- Networks – Building Network and its types- Overview of Internet - Protocol Layering - OSI Mode – Physical Layer – Overview of Data and Signals - introduction to Data Link Layer - Link layer Addressing- Error Detection and Correction

UNIT II MEDIA ACCESS & INTERNETWORKING 9

Overview of Data link Control and Media access control - Ethernet (802.3) - Wireless LANs - Available Protocols - Bluetooth - Bluetooth Low Energy - WiFi - 6LowPAN-Zigbee - Network layer services - Packet Switching - IPV4 Address - Network layer protocols (IP, ICMP, Mobile IP)

UNIT III ROUTING 9

Routing - Unicast Routing - Algorithms - Protocols - Multicast Routing and its basics - Overview of Intradomain and interdomain protocols - Overview of IPv6 Addressing - Transition from IPv4 to IPv6

UNIT IV TRANSPORT LAYER 9

Introduction to Transport layer -Protocols- User Datagram Protocols (UDP) and Transmission Control Protocols (TCP) -Services - Features - TCP Connection - State Transition Diagram - Flow, Error and Congestion Control - Congestion avoidance (DECbit, RED) - QoS - Application requirements

UNIT V APPLICATION LAYER 9

Application Layer Paradigms - Client Server Programming - World Wide Web and HTTP - DNS- - Electronic Mail (SMTP, POP3, IMAP, MIME) - Introduction to Peer to Peer Networks - Need for Cryptography and Network Security - Firewalls.

TOTAL:45 PERIODS**OUTCOMES:**

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

- Identify the components required to build different types of networks
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Trace the flow of information from one node to another node in the network

TEXT BOOK:

1. Behrouz A. Forouzan, Data communication and Networking, Fifth Edition, Tata McGraw - Hill, 2013 (UNIT I -V)




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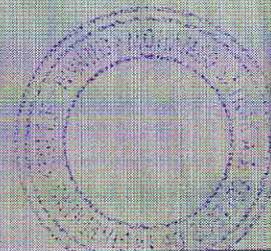
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Duration: 17/06/19 to 26/06/19


Director-Technical


HR Manager



26/06/19
Date of issue

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