



K.RAMAKRISHNAN COLLEGE OF ENGINEERING

An Autonomous Institution

Permanently Affiliated to Anna University Chennai, Approved by AICTE New Delhi,
ISO 9001:2015, 14001:2015 certified institution, Accredited by NBA and with A grade by NAAC

Samayapuram, Tiruchirappalli – 621 112, Tamilnadu, India.



**“One book, one pen, one
child and one teacher can
change the world.”**

2024 - 2025

**JAN -JUNE
ISSUE -2**



Krce.ac.in



Dr. K. Ramakrishnan

CHAIRMAN

Dr. K. Ramakrishnan, the esteemed Chairman of our institution, is a visionary leader whose dedication, discipline, and dynamic outlook serve as a constant source of inspiration for the students of the Electronics and Communication Engineering (ECE) Department. A proud alumnus of Annamalai University with a B.E. in Production Engineering, he has devoted his efforts to transforming this rural region into a center of technological and educational excellence. His commitment to hard work, innovation, and leadership motivates ECE students to strive for excellence in their academic and professional pursuits, inspiring them to become creative thinkers, responsible engineers, and future leaders who contribute meaningfully to society.

Dr.S.Kuppusamy



EXECUTIVE DIRECTOR

Dr. S. Kuppusamy, the Executive Director of our institution, is a passionate academician whose dedication and commitment to excellence have shaped his career in education. He holds a B.Sc. in Electronics from Erode Arts College, an MBA from Kongu Engineering College, and a Ph.D. in Management from Bharathiar University, Coimbatore. His blend of technical knowledge and leadership inspires the Electronics and Communication Engineering (ECE) students to pursue innovation, discipline, and success in their academic and professional paths.



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Dr.D.SRINIVASAN

PRINCIPAL

Dr.D.Srinivasan, The Principal of K.Ramakrishnan College of Engineering, Tiruchirappalli, is a vibrant leader with his ground-breaking approach and proven administrative process produces many young engineering professionals to this society. He received his Ph.D. and Post-Graduation in Manufacturing Technology from the nation's top grade institution NIT, Trichy. Education is not just a process of giving knowledge for a future job but a lifelong process which builds an understanding of moral and ethical values to guide one's life in a right path. KRCE not only focuses on the academic front, but also helps in the development of a student's personality, extra-curricular activities and over all perspective. Everything that makes a good institution - well equipped R&D Cells, Lab facilities for all the departments, Wi-Fi enabled campus, well stacked library with digital facility, career guidance, unique teaching methods, training for competitive examinations, liberty to think and express themselves all are available to mould them to face the challenges confidently

Dr.M.MAHESWARI



HEAD OF THE DEPARTMENT

I am deeply thankful to the Board of management, Director Principal, and the Heads of various departments. Faculty members for their consistent support and active involvement in motivational activities of our department. I extend my heart full thanks to the editorial committee members and students for their tireless effort towards releasing this magazine. Choosing electronics field as profession needs challenging creative and extraordinary mind it gives me pleasure to lead such innovative students, who are the future experts of India



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DEPARTMENT OF ECE VISION

VISION

To be distinguished as a prominent program for Electronics and Communication Engineering Studies by preparing students for Industrial Competitiveness and Societal Challenges.

MISSION

M1: To equip the students with latest technical, analytical and practical knowledge.

M2: To provide vibrant academic environment and Innovative Research culture.

M3: To provide opportunities for students to get Industrial Skills and internships to meet out the challenges of the society.

The PEOs of the programme are,

PEO1: Graduates will be competent enough to design, develop and integrate complex industrial products for modern electronics and communication systems.

PEO2: Graduates will be able to propose research oriented, industry relevant design solutions in state-of-the-art electronics and communication domains.

PEO3: Graduates will be able to engage in start-up and entrepreneurial activities developing innovative prototypes for the challenging needs of the society.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Students will qualify in National level Competitive Examinations for Employment and Higher studies.

PSO2: Students will have expertise in the design and development of Hardware and Software tools to solve complex Electronics and Communication Engineering problems in the domains like analog and digital electronics, embedded and communication systems.



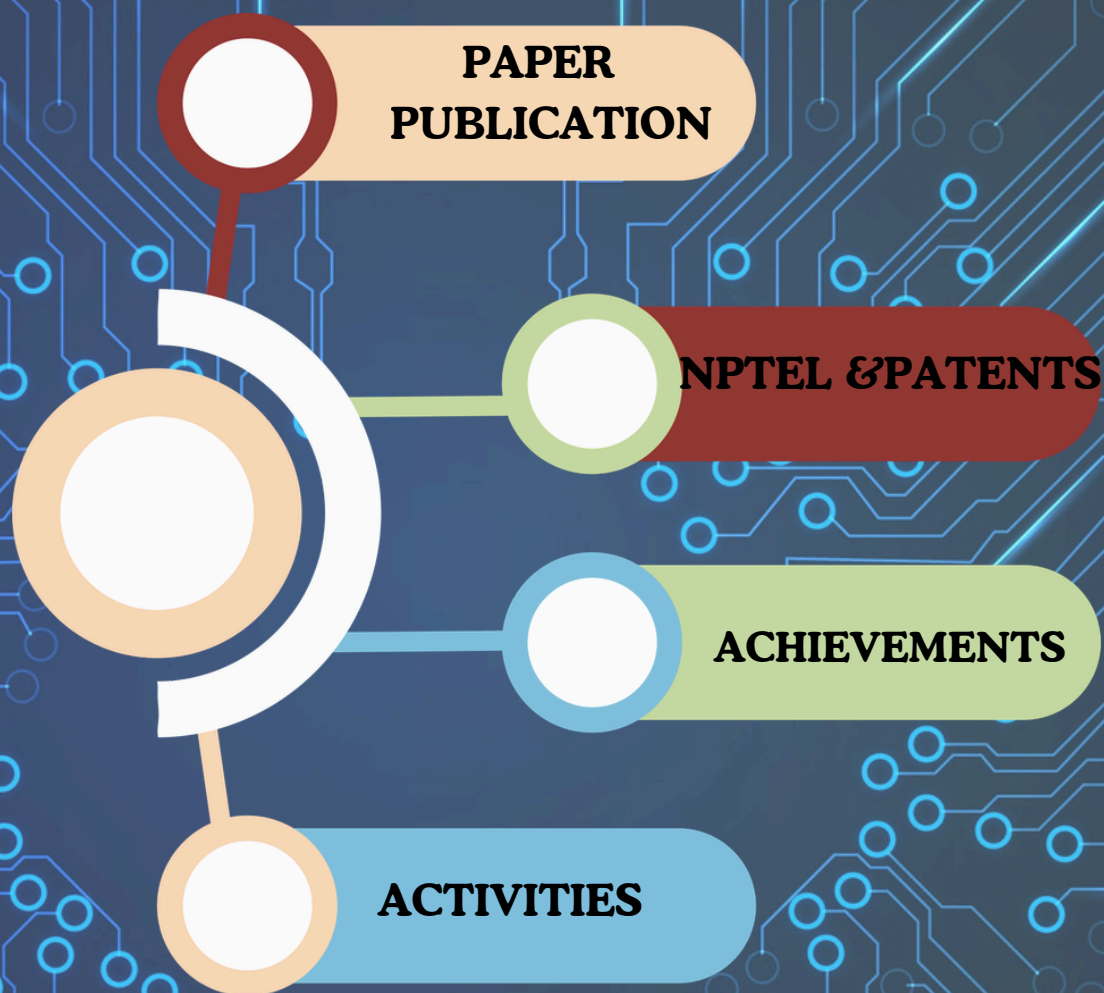
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



PAPER PUBLICATION STAFF 24-25

TOTAL PUBLICATION:74

- ★ Dr.M.Maheswari Moving Object Detection in Improved Deep CNN enhanced HEVC decoded Video
- ★ Dr.M.Maheswari Pragmatic analysis of polyphase CIC decimation filter for next generation wireless applications
- ★ Dr.M.Maheswari Automatic oral cancer detection using deep learning techniques
- ★ Dr.M.Maheswari Wearable sensor-based measurement and classification of athletic activities using FPGA and EdgeTPU
- ★ Dr.M.Maheswari Design of Proficient Fused MAC Unit for PID Controllers
- ★ Dr.H.Sudarsan Novel neural network classification of maternal fetal ultrasound planes through optimized feature selection
- ★ Dr.H.Sudarsan Deep Adaptive Learning-Based Beam Combining Framework for 5G Millimeter-Wave Massive 3D-MIMO Uplink Systems
- ★ Dr.H.Sudarsan Millimeter wave–3D massive MIMO: Deep prior-aided graph neural network combining with hierarchical residual learning for beam space channel
- ★ S.Janu Priya Asymmetric Coplanar Strip Loaded with Meander Lines for Multiband Operations Using ANN Optimization



**PAPER PUBLICATION
STAFF 24-25**

TOTAL PUBLICATION:74

- ★ S.Janu Priya ACS - Fed Antenna Loaded with Resonator for Dual band Application
- ★ Mr. N. R. Nagarajan Explore Strategies for Sustainable Water Management in Rapidly Growing Urban Systems
- ★ Mr. N. R. Nagarajan Meta surface Based Surface Plasmon Resonance (SPR) Biosensor for Cervical Cancer Detection with Behaviour Prediction using Machine Learning Optimization Based on Support Vector Regression
- ★ Mr. N. R. Nagarajan Dynamic Network Security Leveraging Efficient CoviNet with Granger Causality-Inspired Graph Neural Networks for Data Compression in Cloud IoT Devices
- ★ Mr. N. R. Nagarajan Predictive Modelling for Cirrhosis Diagnosis: A Machine Learning Exploration
- ★ Dr.G.Kalpanadevi High Sensitivity Terahertz Biosensor Based on Graphene/ Methylammonium Lead Halide Meta surface with Machine Learning-Enhanced Pathogen Detection
- ★ Dr.G.Kalpanadevi A Detailed Analysis of Wavelet Based Multi Focus Image Fusion Techniques
- ★ Dr.G.Kalpanadevi AI-Enhanced Emotion Recognition through Galvanic Skin Response and ECG Analysis for Improved Accuracy and Reliability
- ★ Dr.G.Kalpanadevi Digital Processing Signal



**PAPER PUBLICATION
STAFF 24-25**

TOTAL PUBLICATION:74



Dr. M. Vinoth Enhanced blood prothrombin time detection deploying flexible substrate UWB antenna from artifacts removed pure plasma through statistical multiple regression modelling



Dr. M. Vinoth Flexible And Improved Antenna for Drone Applications

Dr.K.Priyadarshini Human lung cancer classification and comprehensive analysis using different machine learning techniques



Dr.R.Samson Daniel Asymmetric Coplanar Strip Fed multiband loop antenna with FSS cover for gain improvement.



Dr.S.Stephe Correction to: Chaotic Satin Bowerbird Optimizer Based Advanced AI Techniques for Detection of COVID-19 Diseases from CT Scans Images



Dr.S.Stephe Transformer Based Attention Guided Network for Segmentation and Hybrid Network for Classification of Liver Tumour from Ct Scan Images

Dr.S.Stephe Supply chain management using fermatean fuzzy-based decision making with ISSOA



Dr.S.Stephe Osteosarcoma cancer detection using ghost-faster RCNN model from histopathological images



Dr.S.Stephe Blockchain-Based Private AI Model with RPOA Based Sampling Method for Credit Card Fraud Detection





**PAPER PUBLICATION
STAFF 24-25**

TOTAL PUBLICATION:74

- ★ Dr.S.Stephe Enhancing Brain tumour Detection and Classification using Osprey Optimization Algorithm with Deep Learning on MRI Images
- ★ Dr.S.Stephe Adaptive Wind Driven Optimization based Energy Aware Clustering Scheme for Wireless Sensor Networks
- ★ Dr.S.Stephe Improved Scalp Swarm Optimization with Generative Adversarial Network for Recognition of Motor Imagery EEG
- ★ Dr.C.Jeyalakshmi Prediction of clinical risk factors in pregnancy using optimized neural network scheme
- ★ Dr.C.Jeyalakshmi Machine learning approach of Audio-visual based Emotion Recognition: A comparative analysis
- ★ Mr.A.B.Balakumar Optimizing Mobile Advertising with Reinforcement Learning and Deep Neural Networks
- ★ Mr.A.B.Balakumar Utilizing Hybrid Deep Reinforcement Learning and Transformer Networks Predictive Maintenance in Product Safety Engineering
- ★ Mr.A.B.Balakumar Transforming Business Generative Safety with AI Models Applications Trends
- ★ Mr.A.B.Balakumar Exploring Neural Network Models for Pronunciation Improvement in English Language Teaching: A Pedagogical Perspective



**PAPER PUBLICATION
STAFF 24-25**

TOTAL PUBLICATION:74

- ★ Mr.A.B.Balakumar Harmful News Detection using BERT model through sentimental analysis
- ★ Mr.A.B.Balakumar Big Data Analytics for Predictive Maintenance in Smart Grids and Energy Management Systems
- ★ Mr.A.B.Balakumar Financial Risk Prediction in E-Commerce: Leveraging Vampire Bat Optimization and Factor Analysis for Enhanced Decision-Making
- ★ Mr.A.B.Balakumar Analysing Mutual Fund Performance: A Hybrid Approach Using LSTM with explainable AI Techniques
- ★ Mr.A.B.Balakumar Improving Market Efficiency and Profitability in High-Frequency Trading Using Neural Network-Based Deep Learning Techniques
- ★ Mr.A.B.Balakumar Optimization of BERT Algorithms for Deep Contextual Analysis and Automation in Legal Document Processing
- ★ Mr.A.B.Balakumar Cloud-Based IoT Solutions for Smart Grids: Advancing Smart Technologies in Energy Management
- ★ Ms.S.Anusuya Enhancing Student Placement Predictions with a Trans-CLSTM Based Recommendation System
- ★ Ms.Radha N Feasible implementational for generation processors



**PAPER PUBLICATION
STAFF 24-25**

TOTAL PUBLICATION:74



Ms.Radha N An Energy efficient reconfigurable polar encoder for the next generation wireless applications



Mrs..N.Srividhya Deep Innovations Learning for Improved Plant Leaf Disease Detection in Smart Agriculture



Mrs..N.Srividhya Discrete Time Signal Processing,



Mrs.A.VIDYA Improving Stroke Brain Diagnosis with SHAP-Enhanced Predictive Modelss



Mr.Syed Husain Creating Hybrid Index Alert Messages Based on Wild Animal Activity Detection Using Hybrid Deep Neural Networks



Mr.Syed Husain An Exploration of The Performance Suing Methods Random Classifier Ensemble Utilizing Forest for Diabetes Detection



Mr.Syed Husain Outperforming Cryptocurrency Price Prediction Using Deep Reinforcement Learning Approach



Mr.Syed Husain An Approach Efficient for Obstacle Avoidance and Navigation In Robots



Mrs.J Roselin Suganthi Evaluation Of Muscle Fatigue Based on SEMG Using Deep Learning Techniques



**PAPER PUBLICATION
STAFF 24-25**

TOTAL PUBLICATION:74

- ★ Mrs.J Roselin Suganthi Pattern Recognition for EMG Based Forearm Orientation and Contraction in Myoelectric Prosthetic Hand
- ★ Mr.T.Muruganantham Development Of Deep Neural Framework for Human Activity Recognition
- ★ Mr.T.Muruganantham A Novel Approach for Electricity Load Forecasting Using Hybrid Deep Learning Models
- ★ Mr.T.Muruganantham Deep Learning Based Autonomous Transport System for Secure Vehicle and Cargo Matching
- ★ Mr.Syed Husain Creating Hybrid Index Alert Messages Based on Wild Animal Activity Detection Using Hybrid Deep Neural Networks
- ★ Mr.Syed Husain An Exploration of The Performance Suing Methods Random Classifier Ensemble Utilizing Forest for Diabetes Detection
- ★ Mr.Syed Husain Outperforming Cryptocurrency Price Prediction Using Deep Reinforcement Learning Approach
- ★ Mr.Syed Husain An Approach Efficient for Obstacle Avoidance and Navigation In Robots
- ★ Mr. K. Vigneshwaran Predicting Student Performance and Its Outcomes in the Modern Education Systems Using Attention Based BIRNN And CNN Method



**PAPER PUBLICATION
STAFF 24-25**

TOTAL PUBLICATION:74

- ★ Mr. K. Vigneshwaran Substrate Integrated Waveguide Antenna with Slots for Multiband Operation Using ANN
- ★ Mr. K. Vigneshwaran Melanoma Malignancy Prognosis Using Deep Transfer Learning
- ★ Mr. K. Vigneshwaran Deep fore: A Deep Reinforcement Learning Approach for Power Forecasting in Renewable Energy Systems
- ★ Ms.R.Mahima A Comparative Analysis of the Most Commonly Used Activation Functions in Deep Neural Network
- ★ Ms.R.Mahima Reconfigurable Rounding Based Approximate Multiplier for Floating Point Numbers
- ★ Ms.P.Malini An Efficient Implementation of Modified Digital Synapse Design for Neural Network
- ★ Ms.P.Malini Wireless Sensor Network-Based Intrusion Detection Technique Using Deep Learning Approach of CNN-Gru
- ★ Ms.P.Malini An Efficient Full Adder by Investigating XOR And XNOR Logics with PMOS And NMOS
- ★ Ms.S.Rajapriya Multiband Planar Antenna Employing Open Complementary Split Ring Resonator Metamaterial Element

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



PAPER PUBLICATION STAFF 24-25

TOTAL PUBLICATION:74

- ★ Ms.S.Rajapriya Half Mode Substrate Integrated Waveguide Antenna Embedded with Slots for Multiband Operations
- ★ Mr.M.Karthick Optimizing Energy Usage and Data Storage in Industrial Iot Settings Through Heuristic-Based Data-Rate Processors



NPTEL 24-25

- No of Certificate Received - 31
 - Percentage of completion - 93.93
- ★ **No of Students completed : 170**
- Elite+Gold -Topper 1% -1,
Elite+Gold -Topper 2% -1
Elite+ Silver [Topper 2%]- 1
Elite+ Silver- Topper 5 % -3
Elite with Silver-32
Elite-97
Successful Completion -35

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



PATENT GRANTED 24-25

S.NO	Name Of the Faculty	Topic	Cbr Number/Patent Number/Applicatio n Number	Cbr Date/Status
1	Mrs. J.Roselin Sugnathi	Artificial Intelligence based Stress Detection Device	427074-001	14/08/2024
2	Mr.R.Balamurugan, ,Dr.T.Muruganatham, Mr.N.R.Nagarajan	Biodegradable AGAVE SISALANA Sanitary Pads	4419LPS	22/08/2024
3	Mr.A.Balakumar Mr. S. Syedhusain, Dr.B.Viswanathan	An internet of Things based hospital and patient caring system	4417LPS	22/08/2024

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PATENT PUBLISHED 24-25

S.NO	Name Of the Faculty	Topic	Cbr Number/Pa tent Number/A pplication Number	Cbr Date/Status
1	Mr.N.R.Nagarajan Dr. T. Muruganantham R. Balamurugan P. Charu Prabha	A HAPNAN Wheelchair System For Physically Challenged People	2024410512 47 A	07/12/2024
2	Mr. N. R. Nagarajan Mr. T. Muruganantham, Vasudhevan.G Shreeram.RR	A System For Recycling Of Chalk Sticks From Unused Chalk Fragments	2024410551 01 A	07/12/2024
3	Mr.N.R.Nagarajan Dr. T. Muruganantham Vasudhevan.G	Artificial Intelligence Assisted Telemedicine Robotic KIOSK	2024410889 80 A	11/22/2024

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PATENT PUBLISHED 24-25

S.NO	Name Of the Faculty	Topic	Cbr Number/Patent Number/Applica tion Number	Cbr Date/Status
4	Mr.N.R.Nagarajan Dr.E.Manigandan Kolli Venkatrao Dr.Gali Nageswara Rao	Artificial Intelligence in Higher Education Advancing Teaching and Learning Through pedagogical Intelligence	202411085792 A	22/11/2024
5	Mr.A.Balakumar Samyutha M Niranjana M Subasree G Sakthi Iswarya S	Lead Holding Mechanical Pencil	202441088991	22/11/2024
6	Mr.A.Balakumar Sakthi Iswarya S Rakshana S Vaijayanthi S	Mini saree pleating Machine	202441088979	22/11/2024

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PATENT PUBLISHED 24-25

S.NO	Name Of the Faculty	Topic	Cbr Number/Patent Number/Application Number	Cbr Date/Status
7	Ms.S.Anusuya Mr.S.Syedhusian Ranjani J	A Fusion of Microchip and Illumination Technology	202441071349	04.10.2024
8	Harishaa.M Kavipriya.R R.Ramya	A Self Healing Food Packet System	202441088983	22.11.2024
9	Dr.B. Viswanathan M.Karthick Ragul G Mohith P S Prawin K Ragul R Vaishnavi S Deva R	A Smart Toilet System	202441051246	07/12/2024

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PATENT GRANTED 24-25

S.NO	Name Of the Faculty	Topic	Cbr Number/Patent Number/Applica tion Number	Cbr Date/Status
10	Harini S K ,Dr.C.Jeyalakshmi, Ms.Radha N, Ms.Ramya R	An Auto Tap Tooth Brush	202441089002 A	22.11.2024
11	Anandha Kumar T,Karthick, Deepan Prakash S, Lakshman Ram M, Ms. Radha N, Dr. M. Maheswari	Med Co Bot	202441088994 A	22.11.2024
12	Dr.M.Maheswari Ms. Anusuya S Priyanga C	A Piezo Community Connector	202441088977 A	22.11.2024

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PATENT GRANTED 24-25

S.N O	Name Of the Faculty	Topic	Cbr Number/Patent Number/Applicat ion Number	Cbr Date/Status
13	Abbas S, Harshavardan V P, Kamaleshkumar V, Ms. Radha N, Dr. Maheswari M	An Intereactive Writing Pad With Pen	202441088981 A	11/22/2024
14	Janarthanan T, Aswak P, Kartheeswaran M, Aravind Chockalingam M Dr. C. Jeyalakshmi, Dr. R. Samson Daniel	An Orchard Assistant	202441089011 A	11/22/2024
15	Hasin Zafina N, Deni Sebasta Dr.G.Kalpana Devi, Mrs.S.Janu Priya	A System For Hanging Clothes	202441088987 A	11/22/2024
16	Dr. M. Vinoth	Iot-Based Telematics System For Enhanced Vehicle Communication	202441071349	9/20/2024

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



PATENT GRANTED 24-25

S.NO	Name Of the Faculty	Topic	Cbr Number/Patent Number/Applicati on Number	Cbr Date/Statu s
13	Abbas S, Harshavardan V P, Kamaleshkumar V, Ms. Radha N, Dr. Maheswari M	An Intereactive Writing Pad With Pen	202441088981 A	11/22/2024
14	Janarthanan T, Aswak P, Kartheeswaran M, Aravind Chockalingam M Dr. C. Jeyalakshmi, Dr. R. Samson Daniel	An Orchard Assistant	202441089011 A	11/22/2024
15	Hasin Zafina N, Deni Sebasta Dr.G.Kalpana Devi, Mrs.S.Janu Priya	A System For Hanging Clothes	202441088987 A	11/22/2024
16	Dr. M. Vinoth	Iot-Based Telematics System For Enhanced Vehicle Communication	202441071349	9/20/2024

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



PATENT GRANTED 24-25

S.NO	Name Of the Faculty	Topic	Cbr Number/Patent Number/Applicat ion Number	Cbr Date/Status
21	Mr.R.Balamurugan	A Novel Forest Fire Detection System Using Wireless Sensory Networks	202441062373	17/08/2024
22	Mr.R.Balamurugan	A System and Mehtod for Evaluating Performance to provide energy efficient 5G networks	202541033826	05/02/2025
23	Mr.R.Balamurugan	A Machine learning based system for anamoly detection in data streams	202541002710	24/01/2025
24	Dr.C.Jeyalakshmi	Development Of A Music Therapy System To Support The Alcoholism Recovery	202441098212	20/12/2024

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



PATENT GRANTED 24-25

S.NO	Name Of the Faculty	Topic	Cbr Number/Patent Number/Application Number	Cbr Date/Status
25	Mrs N.Srividhya	5G antenna for wireless communication	438189-001	02/12/2025
26	Mrs N.Srividhya	Battery Management System for Electric Vehicles with Real Time Monitoring	420832-001	08/08/2024
27	Mr.N.R Nagarajan Mr.T.Muruganantham Mrs.S.Janupriya Mrs.A.K Thasleem Sulthana Ms.S.Anusuya R.Jayasurya S,ArunPrakash T.Janani P.Hemapriya	Automated Bed Light	202141060489 A	13/12/2024

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



PATENT GRANTED 24-25

S.N O	Name Of the Faculty	Topic	Cbr Number/Patent Number/Applicatio n Number	Cbr Date/Status
28	A.Vidya	Machine Learning To Analyze The Impact Of Teacher Social Support And Self-Efficacy On Health-Promoting Behaviors In Higher Education	202441081878	26/10/2024
29	Dr. M. Vinoth	Power Management Devices for green wireless sensor network	6418181	23/01/2025

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



ACHEIVEMENTS



**1. RAKSHITHA T, A.PRAVEEN,
S.PRIYADHARSHINI,
G.RAJALAKSHMI,
S.THIRUVENGADAM,
G.YOGASHINI OF III YEAR ECE
HAVE WON RS.50,000 AS JOINT
WINNER IN FINAL PHASE OF
SMART INDIA HACKATHON
2024(11-15TH DEC,2024)**



**1. J RANJANI, VARSHINI R S, SHANAWAZ S H OF III-YEAR ECE HAVE WON
RS.5,000 IN START UP COMPETITION CONDUCTED BY VEL-TECH, CHENNAI IN
2025**

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



ACHEIVEMENTS



**1. J RANJANI, VARSHINI R S, SHANAWAZ S H OF IV-YEAR ECE HAVE
WON RS.10,00,000 IN MSME 2025**



**1. S SATHYANARAYANAN, YAZHINI B OF III YEAR ECE HAVE WON Rs.11,85,000
IN MSME 2025.**

SMART GRIDS - INTELLIGENCE MEETS POWER DISTRIBUTION

AUTHOURS: ECC2140-SUBHASRI K & ECA2101-AARTHIKA P

Traditional electrical grids are undergoing a transformation. Smart grids use digital communication and automation to create an intelligent power distribution network that benefits both utilities and consumers.

UNDERSTANDING SMART GRIDS

A smart grid is an evolved electricity network that uses telecommunications and automation to monitor, forecast, and optimize energy usage. Unlike traditional grids that deliver power in one direction from power plants to consumers, smart grids enable two way communication between producers and users.

KEY COMPONENTS SMART METERS:

Digital devices that record electricity consumption in real time and communicate this information back to utilities. They replace traditional meters that require manual reading. Sensors and Monitors: Distributed throughout the grid to detect faults, measure power quality, and track system performance. Communication Networks: Connect all components using wireless or fiber optic technology to enable data exchange. Automation Systems: Automatically respond to changes in demand, reroute power around failures, and optimize distribution. Energy Management Software: Analyzes data from all components to make intelligent decisions about power distribution.

HOW SMART GRIDS WORK

When you turn on an appliance, smart meters instantly record the power consumption and send this data to the utility company. Advanced software analyzes consumption patterns across thousands of homes and businesses. If demand starts exceeding supply in one area, the system can automatically reroute power from other sources or activate backup generators

During power outages, smart grids can isolate the affected section and restore power to unaffected areas within minutes instead of hours. Sensors detect the fault location, and automated switches redirect power flow around the problem area.

BENEFITS OF SMART GRID TECHNOLOGY

Reduced Power Losses: Traditional grids lose 8 to 15 percent of electricity during transmission and distribution. Smart grids reduce these losses through optimized routing and voltage management. **Faster Outage Recovery:** Automated fault detection and isolation restore power much faster than manual processes. **Integration of Renewable Energy:** Smart grids can handle the variable output from solar panels and wind turbines by balancing supply from multiple sources. **Peak Demand Management:** By monitoring consumption patterns, utilities can encourage users to shift energy intensive activities to off peak hours through time based pricing. **Improved Power Quality:** Continuous monitoring ensures voltage and frequency remain within acceptable ranges, protecting sensitive electronic equipment. **Real World Applications** India has been implementing smart grid projects in several cities. The Smart Grid Pilot Project covered areas in states like Rajasthan, Gujarat, and Karnataka. These projects demonstrated how smart grids reduce distribution losses and improve service reliability. Many residential areas now have smart meters that show real time consumption. Some utilities offer mobile apps where consumers can track their usage hour by hour and identify which appliances consume the most power.

CHALLENGES IN IMPLEMENTATION

High Initial Investment: Installing smart meters, sensors, and communication infrastructure requires substantial capital. **Cybersecurity:** Connected systems are vulnerable to hacking. Protecting grid infrastructure from cyber attacks is essential. **Data Privacy:** Smart meters collect detailed consumption data. Ensuring this information remains private is important. **Technical Expertise:** Operating and maintaining smart grids requires skilled personnel with knowledge of both electrical engineering and information technology.

Internet of Things and Smart Grids The integration of IoT devices with smart grids creates even more possibilities. Smart thermostats, solar inverters, and electric vehicle chargers can communicate with the grid to optimize energy usage. For example, EV chargers can automatically charge vehicles during off peak hours when electricity is cheaper and more abundant.

CAREER OPPORTUNITIES

Smart grid technology creates demand for electrical engineers with skills in:
Power systems analysis Communication protocols and networking Data analytics and software programming Cybersecurity for critical infrastructure Renewable energy integration

THE FUTURE OF SMART GRIDS

As technology advances, smart grids will become even more intelligent. Artificial intelligence will predict demand patterns and optimize distribution in real time. Blockchain technology might enable peer to peer energy trading, where homeowners with solar panels sell excess power directly to neighbors. Energy storage systems, including batteries and pumped hydro storage, will integrate with smart grids to store excess renewable energy and release it during peak demand.

CONCLUSION

Smart grid technology represents the convergence of electrical engineering, telecommunications, and computer science. As India and other nations modernize their power infrastructure, electrical engineers who understand smart grid systems will be in high demand. This technology is essential for integrating renewable energy sources and building a sustainable energy future.

Dr.K.RAMAKRISHNAN

CHAIRMAN

Dr.S.KUPPUSAMY

EXECUTIVE DIRECTOR

Dr.D.SRINIVASAN

PRINCIPAL

Dr.M.MAHESWARI

HEAD OF THE DEPARTMENT

SUBHASRI K (IV YEAR ECE 'C' SECTION)

AARTHIKA P (IV YEAR ECE 'A' SECTION)

DIWAKAR G (IV YEAR ECE 'B' SECTION)

ABBAS S (III YEAR 'B' SECTION)

RAKSHITHA T (III YEAR 'A' SECTION)

KEERTHANA G (III YEAR 'B' SECTION)

DENI SEBASTIA – II YEAR ECE 'A' SECTION

KIRISHA – II YEAR ECE 'A' SECTION

INFANT STAFFAN – II YEAR ECE 'A' SECTION

PRIYADHARSHINI R – II YEAR ECE 'B' SECTION

SANTHOSH KUMAR S – II YEAR ECE 'B' SECTION

6UMA DEVI S – II YEAR ECE 'B' SECTION

STUDENT COORDINATORS

Mrs.JANUPRIYA(AP/ECE)

Mr.INFANT STAFFAN

EDITOR

