

DEPARTMENT OF
ELECTRONICS & COMMUNICATION ENGINEERING
Presents

The Flip Flops

A Quarterly Newsletter | Vol. 3 Issue 3
JULY - SEPTEMBER 2024



Guru Ghasidas Vishwavidyalaya
Bilaspur, Chhattisgarh

A Central University established by the Central University Act 2009 No. 25 of 2009

THE BEST IS YET TO COME

Embark on a captivating journey into the dynamic realm of electronics and communications, where the frontiers of innovation expand beyond imagination. Envision a future where technology intricately integrates into every facet of our lives, forging connections that were once mere figments of our imagination. From the transformative capabilities of quantum computing to the lightning-fast speeds of 6G and beyond, we stand at the precipice of a revolution that will redefine what is possible.

Join us as we delve into the compelling narrative of technological advancement — an odyssey marked by groundbreaking discoveries and limitless potential. Prepare for a world where electronics and communications converge, unlocking an array of opportunities that promise to enhance our existence and reshape our interactions. The best is indeed yet to come, and the possibilities are boundless.



TABLE OF CONTENT

01. Message From The Officials.....	04-07
1.1 From The Desk Of Hon'ble Vice Chancellor.....	04
1.2 Greetings From The Registrar.....	05
1.3 Message From The Dean, SoS(E&T).....	06
1.4 Ambition Of The Head Of Department.....	07
02. Articles.....	08-12
2.1 Faculty Article.....	08-09
2.2 Alumni Article.....	10
2.3 Scholar Article.....	11
2.4 B.Tech Student Article.....	12
03. Achievement.....	13-15
3.1 Faculty Achievement.....	13
3.2 Student Achievement.....	14
3.3 Placements, Internships & Certifications.....	15
04. Departmental Activity.....	16-17
4.1 Lecture Series.....	16
4.2 Teacher's Day.....	17
05. Our Team.....	18
5.1 The Flip Flops Team.....	18

From The Desk Of Hon'ble Vice-Chancellor



Prof. Alok Kumar Chakrawal
Vice-Chancellor,
Guru Ghasidas Vishwavidyalaya

As we reflect on the role of engineering in shaping the future, we are reminded of the timeless words of India's first engineer, Mokshagundam Visvesvaraya: 'Science is about knowing, and engineering is about doing'. In line with this thought, all the endeavors of the ECE department from the School of Studies in Engineering and Technology are proudly presented in this quarterly newsletter, Flip - Flops. This edition highlights events, faculty accomplishments, student achievements, and celebrates every milestone, no matter how small. These recognitions inspire and nurture our students, encouraging them to strive for excellence.

I appreciate the efforts of the Dean of SoS (E&T), the Head of the ECE Department, and the dedicated faculty for fostering such an enriching environment for our future engineers. My heartfelt congratulations to the team behind Flip - Flops. May this be the beginning of a new era of learning and innovation!

My best wishes and good luck to our upcoming engineers!

Greetings From The Registrar



Prof. A. S. Ranadive
Registrar,
Guru Ghasidas Vishwavidyalaya

In the digital world that we now inhabit, technological advancements are dynamic and unplanned. Thanks to the world's rapid progress, young brains have a lot of opportunities to reach new heights. I want to express my gratitude to the brilliant and dedicated members of our academic staff who are working to make the Guru Ghasidas Vishwavidyalaya's School of Studies of Engineering and Technology a bastion for nurturing diligent students in India. The department of Electronics and Communication Engineering has a distinguished history of success. We are certain that the new initiative to publish a quarterly ECE newsletter "Flip - Flops" will contribute to all round growth of our exceptional human resources.

Message From The Dean, SoS (E&T)



Prof. Sharad Chandra Srivastava
Dean, SoS (E&T)
Guru Ghasidas Vishwavidyalaya

Engineers make the world and also keep it running.

I am pleased to extend my heartfelt congratulations to the editorial team , contributors , and researchers for the publication of this three-monthly news bulletin focused on Flip-Flop technology in the field of Electronics and Communication Engineering. The Flip-Flops is a fundamental building block of digital systems, and advancements in this area have a profound impact on the future of computing, communication, and control systems.

This news bulletin serves as a testament to the hard work and dedication of our academic community in exploring cutting-edge technologies and pushing the boundaries of innovation. It is crucial that we continue to foster an environment of research and collaboration, allowing our students , faculty, and researchers to contribute to the ever-evolving landscape of technology.

I am confident that this publication will inspire further studies and innovations in the domain, making significant contributions to both academia and industry. I look forward to witnessing the new developments that will emerge from these efforts and the continued excellence of our institution.

Best wishes for continued success and growth.

Ambition Of The Head Of The Department



Dr. Soma Das
Head of Department
Electronics and Communication Engineering,
Guru Ghasidas Vishwavidyalaya

The Electronics and Communication Engineering (ECE) department is dedicated to fostering the academic & professional growth of its students. In order to ensure student success and align with the latest industry trends, the department continually revises and updates its curriculum. Our graduates have established a strong presence and excellent reputation across various sectors, including business, government, and academia. In today's rapidly evolving world, there is an increasing need for enhanced collaboration between academic institutions and industry.

I extend a warm invitation to recruiters and graduating students to come together on a unified platform, facilitating mutual growth and opportunities. This collaboration will not only help recruiters tap into the best emerging talent but also enable student to maximize their potential by gaining practical insights and experience.

ARTICLE SECTION

FACULTY ARTICLE

Quantum Computing: A Glimpse into the Future of Technology

Quantum computing, a field that merges the fascinating principles of quantum mechanics with computation, has been heralded as the next transformative technology, poised to revolutionize industries ranging from healthcare and cryptography to artificial intelligence and logistics. While classical computers, which have served humanity for decades, process information in binary bits (0s and 1s), quantum computers harness the unique properties of quantum bits, or qubits, enabling them to perform certain computations exponentially faster.



Dr. Prabira Kumar Sethi
Associate Professor, ECE

What Makes Quantum Computing Unique?

At the heart of quantum computing lies three critical phenomena: superposition, entanglement, and quantum interference.

- **Superposition** allows qubits to exist in multiple states (both 0 and 1 simultaneously) rather than being confined to a single binary state. This gives quantum computers the power to process vast amounts of information in parallel.
- **Entanglement** is a quantum phenomenon where qubits become interconnected in such a way that the state of one qubit is directly related to the state of another, even when separated by large distances. This allows for instantaneous data sharing between qubits and is one of the key factors behind the immense computational potential of quantum systems.
- **Quantum interference** is used to amplify the correct outcomes of computations and diminish errors, making quantum systems highly efficient at solving complex problems.

Why Quantum Computing Matters?

The potential applications of quantum computing are vast and could reshape many sectors:

- **Cryptography:** Quantum computers could break the encryption algorithms currently used to secure digital communication. However, they also offer the ability to develop quantum-safe encryption methods, ensuring secure information transfer in the quantum era.

- **Drug Discovery and Healthcare:** Quantum computing's ability to model molecular structures with extraordinary precision could lead to breakthroughs in drug discovery, personalized medicine, and understanding diseases at a molecular level.
- **Artificial Intelligence (AI) and Machine Learning (ML):** Quantum computing could accelerate the training of machine learning models, enabling AI systems to learn and adapt at a much faster rate. This could lead to advancements in everything from autonomous vehicles to real-time data analysis.
- **Logistics and Supply Chain:** With its capacity to optimize complex systems, quantum computing could dramatically improve logistics, supply chains, and even financial markets by solving optimization problems that are beyond the reach of classical computers.
- **Material Science:** Quantum computers could aid in the discovery of new materials by accurately simulating their atomic structures, potentially leading to innovations in energy storage, semiconductors, and manufacturing.

Current Challenges

Despite its promise, quantum computing is still in its infancy. One of the biggest challenges is maintaining quantum coherence, where qubits remain stable long enough to perform meaningful computations. Quantum systems are also prone to errors due to environmental factors like temperature fluctuations and electromagnetic interference. To address this, researchers are working on quantum error correction techniques and improving the physical hardware of quantum computers.

Another significant challenge is scalability. Current quantum computers have only a few dozen qubits, and while this is sufficient for experimental purposes, large-scale quantum computation requires thousands or even millions of qubits.

Conclusion

Quantum computing is not just an advancement in technology; it represents a paradigm shift in how we approach computation and problem-solving. While classical computing will remain essential for everyday tasks, quantum computing will open new frontiers, unlocking the potential for unprecedented innovation across multiple industries. As we stand on the brink of this revolution, the future of technology looks brighter—and more quantum—than ever.

ALUMNI ARTICLE

The role of RF Design Engineer: Shaping the future of technology

The role of an RF Design Engineer exemplifies innovation and dedication, significantly shaping the future of RF technology across various fields, including telecommunications, defence, healthcare, and consumer electronics. These engineers develop essential components for wireless communication, such as antennas, amplifiers, and modulators. Their work enhances the performance and efficiency of communication systems, which are fundamental to modern life. In the defence sector, RF Design Engineers design systems for electronic warfare, radar, and secure communications. Their expertise ensures military systems operate effectively in challenging environments, providing crucial advantages in national security. Notably, the work on an electronic warfare project involved creating a module that operates on a single 5V supply across a frequency range of 2 GHz to 18 GHz. This innovative design achieved a remarkable small signal gain of 67.5 dB and delivered a saturated output power of +17 dBm over an input power range of -30 dBm to +10 dBm. To meet stringent requirements for a 40 dB dynamic range, the design incorporated four gain stages, ensuring optimal performance with minimal compression through the selection of wideband MMIC gain block amplifiers and low-noise amplifiers (LNAs).

In healthcare, RF Design Engineers contribute significantly to technologies like MRI machines, our work in the MRI division focuses on legacy RF body coils and addressing preamplifier obsolescence. The role in the verification, validation, and qualification of RF body coils is crucial for product delivery, customer satisfaction, and patient safety. Collaboration with global teams requires effective technical presentations, detailed technical reviews, and adherence to regulatory and quality standards to ensure seamless product delivery.

Additionally, developed a device such as high-power diplexers. The design of a 5 kW, 6.4% duty diplexer at 1030 MHz exemplifies how these 3-port passive devices enable two different devices to share a common communication channel, effectively isolating frequencies to ensure seamless communication in radar applications.

In summary, RF Design Engineers exemplify innovation and dedication in shaping the future of RF technology. Their contributions not only advance the field but also inspire future generations to pursue careers in engineering and technology.



Robert Mark
Alumni ECE

SCHOLAR ARTICLE

Resistive ink-based polarization and incident angle independent wideband absorber for RCS reduction at KU and K band

The increasing demand for radar cross-section (RCS) reduction, particularly in the context of stealth technology and radar-evading systems, has driven significant research into the development of efficient absorbers. In response to this need, we present a novel, thin, single-layered, wideband, polarization-insensitive frequency-selective surface (FSS) absorber specifically designed for RCS reduction in the Ku and K frequency bands. The proposed absorber has been analytically designed and experimentally validated, demonstrating excellent performance in terms of both absorption efficiency and angular stability.



Shrey Anant Sandiman
PhD Scholar ECE

The absorber is constructed using lossy resistive patterns printed with resistive ink on unit cells, arranged periodically over a low-cost FR-4 dielectric substrate with a metal backing. This cost-effective material combination does not compromise performance, making it suitable for practical applications in stealth and radar-evading systems. The absorber achieves over 90% absorption across a frequency range from 15 GHz to 26.6 GHz, with significant absorption peaks at 15.7 GHz, 18.5 GHz, and 22.9 GHz. Absorptivity levels reach 96.8% in the Ku band and 95.7% and 99.3% in the K band, ensuring high efficiency for both frequency ranges. Despite its thin structure, with a thickness of only $0.0835 \lambda_{15}$ (where λ_{15} is the wavelength at 15 GHz), the absorber maintains a wide fractional bandwidth of 55.8%.

The absorption mechanism, analyzed through surface current distribution, induced electric field modeling, and equivalent circuit analysis, highlights the efficient dissipation of electromagnetic energy. The absorber is also polarization-insensitive at normal incidence and maintains a stable response for oblique incidence up to 60° for transverse magnetic (TM) waves, ensuring versatility in diverse operational environments. To validate the design, a prototype of the absorber was fabricated, and experimental results closely matched simulated outcomes. The combination of a thin, single-layered structure, wideband response, and polarization and angular stability positions this absorber as a highly effective solution for RCS reduction in the Ku and K frequency bands. Additionally, the use of low-cost materials and scalable fabrication methods enhances its commercial viability for advanced stealth and radar-evading applications.

STUDENT ARTICLE

"Agriculture 2.0: How AI and ML can Transform the Industry"

In today's world, farming isn't just about growing crops — it's about doing it smartly. For farmers and traders, dealing with the ups and downs in prices for things like pulses and vegetables (like onions and potatoes) can be really tough. These price swings often happen so fast that it's hard to react, affecting both income and food supply. This is where Artificial Intelligence (AI) and Machine Learning (ML) come in, offering a much-needed solution.

AI and ML models can analyze tons of data, including past price trends, weather forecasts, and current market demand, to predict future prices more accurately than ever before.



Aditya Raj
Pre-Final Year ECE

Think of it like having a weather app that tells you what crop prices will be. By recognizing patterns in how things like rainfall, soil conditions, and global events affect prices, these models help farmers anticipate market changes. For example, if there's a forecast for droughts or floods in a certain area, AI can predict a potential price hike in crops like onions or potatoes months ahead, giving farmers time to make better decisions.

One cool thing about this technology is the use of real-time data from IoT devices, satellite imagery, and even blockchain. These systems provide up-to-the-minute information that makes the predictions more accurate and transparent. Farmers can adjust their strategies on the fly, whether it's timing their harvest or finding better places to sell their produce.

But it's not just about price forecasting. AI and ML also make agriculture more sustainable. They help farmers use water more efficiently, reduce waste, and choose crops that are better suited to changing environmental conditions. The future of agriculture is one where technology not only helps farmers grow smarter but also ensures a stable food supply for everyone.

In a world where unpredictability is the norm, AI and ML are giving the agriculture industry the tools it needs to thrive.

FACULTY ACHIEVEMENT

- **Dr. Nipun Mishra and Mr. Laxmikant Devangan** have published a research paper titled, **“Angularly Stable High-Q Factor Metamaterial Absorber for Biomedical Sensing Applications”**, in IEEE Sensor Letters, Vol. 8, no. 8, pp. 1-4, Aug. 2024, Art no. 3501904, doi : 10.1109/LSENS.2024.3414337.
- **Dr. Nipun Mishra** has achieved the **“ Best Paper Award ”** for the paper titled, **" Wideband Frequency Selective Surface Absorber for Radar Cross Section "** at IEEE international conference INDISCON - 24 organized by IEEE India Council and IEEE Chandigarh Subsection hosted by Punjab Engineering College Chandigarh during 22 - 24th August 24.
- **Dr. Prabira Kumar Sethy** has published a paper entitled **“Machine Learning with Analysis-of-Variance-based Method for Identifying Rice Varieties”** in **"Journal of Agriculture and Food Research, 101397"**.
- **Dr. Prabira Kumar Sethy** has published a paper entitled **“ Deep fine KNN classification of ovarian cancer subtypes using efficientNet - B0 extracted features : a comprehensive analysis”** in **" Journal of Cancer Research and Clinical Oncology 150, no. 7 (2024):361"**.
- **Dr. Prabira Kumar Sethy** has published a paper entitled **“Paddy leaf Disease Classification Using EfficientNet B 4 with Compound Scaling and Swish Activation: A Deep Learning Approach”** in **" IEEE Access"**
- **Dr. Prabira Kumar Sethy** has published a book named **“ Identification, Classification, and Grading of Crops Grain Using Computer Intelligence Techniques : A Review.** Advanced Computational Methods for Agri Business Sustainability, 225-242”.
- **Under the guidance of Dr. Prabira Kumar Sethy Sir** , a PhD Scholar **Arabinda Das** from Sambalpur University (Reg. No. 76/2022/Comp.Sc. & Eng.) was awarded a Ph.D. degree in **' Computer Science and Engg.'** with the title **'Study and Analysis of Maize Diseases Using Image processing Techniques,'** as per Letter no. 8110/Ph.D., dated 26.09.2024.
- **Mr. Chandan Tamrakar** has attended a **“Refresher Course ” “ Technology on Integration in Education and Teaching ”** from **9 , sep. to 23, sep.**
- **Dr. Rajiv Dey** has published a paper entitled **“Prevalence and repercussions of stress and mental health issues on primary and middle school students: a bibliometric analysis”** in **" Journal of frontier in Psychiatry"** Published date: 09, sep. Vol. 15.

STUDENT ACHIEVEMENT

- **Maitri Mahak** (Final Year ECE) has published a research paper on "**Phase transition driven and angle multiplexed broadband / narrowband THz absorber** " in “ **IEEE Transaction on Plasma Science** ” Journal doi: 10.1109 / TPS.2024.3447868.
- **Maitri Mahak** (Final Year ECE) completed a six - week long offline internship at **NIT Patna** in **electromagnetism**, where she got hands - on experience in the simulation and design of **EM Absorber**.
- **Siana Naseem** received the **Merit - based Scholarship** in August for **Topping the School of Study in Engineering & Technology** in her 1st year of Engineering.
- **Siana Naseem** received a **Scholarship** in August for being the University Topper among all 37 different Schools of the University.
- In September, **Sana Pavani** was appointed as the **Women Tech Lead** in **GDGC** for the year 2024-25.
- In September, **Nirbhay Singh** was appointed as the **Marketing & PR Lead** in **GDGC** for the year 2024-25.
- In September, **Aditya Raj** was appointed as the **Vice - Chairperson** of the **GFG Student Chapter GGV** for the year 2024-25.
- **Kush Kumar** secured **28th rank** in the **Aptitude Test** held by **IIT Guwahati** among 15,000 participants.
- **Snigdha Gupta** completed the **AICTE and VIOS - led virtual internship** on **Data Analytics and Power BI**, implemented by the **Connecting Dreams Foundation** in July 2024.
- The following students participated in the **University Level Internal Hackathon for SIH-2024**:

Team Name	Team Members
AgroTech	Ritik Kr Arora, Nishant Kr Jha, Revathi P. Ramachandran, Vivek Kumar, Saket Kr Jha, Sai Amrutha
Boson	Fahad Ahmad, Shristy Gupta, Shivam Bharti, Laxmiprasad Sahu, Imroj Khan, Vineet John
Minions	Surya AM, Amiya Vats, Astha Shukla, Aditya S Kumar, Shreya Singh
Atlas	Sainath Kotage, Snigdha Gupta, Shriyansh Thakur, Sourabh Kumar, Naivedya Sinha, Siddharth Kumar Ravi
Young Stunners	Arya Patel
GT Aryan	Chhayansh Sahu
ElectroCoders	Gaurav Kumar, Nirbhay Singh, Rakesh Bhagat, Divyansh Pandey, Siana Naseem, Mithlesh Singh
Signal Savvy	Prabhakar Kumar Choudhary, Saniya Shristy Gupta, Anant Gupta, Ashish Chandrakar

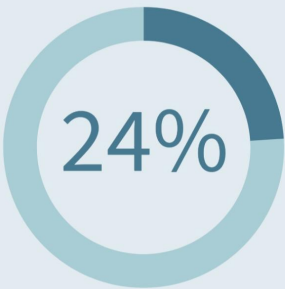
STUDENT ACHIEVEMENT

CERTIFICATION AND COURSE COMPLETION

Name of the student	Certifications and Course Completion	Provided by(Company)
Prabhakar Kumar Choudhary	Artificial Intelligence	Freedom with AI
Prabhakar Kumar Choudhary	AI and ML	Geeks for Geeks
Sudhanshu Raj	AutoCAD	Infosys
Sudhanshu Raj	C Programming	Infosys
Chunesh Kumar Rathore	Generative AI Tools and Techniques	Google Cloud

The following students received certifications for participating in Online Quizzes: Sachin Kumar Singh, Ritik Kumar Arora, Nishant Kumar Jha, Sana Pavani, Prabhakar Kumar Chaudhary, Kush Kumar

INTERNSHIP AND PLACEMENT DATA



- Students placed during March-June 2024
- Students placed during July-October 2024

The following students applied for higher studies:

S.no.	Name of the Student	Name of course	Institute Admitted	Year of Admission
1.	Pothireddy Navaneeswar Reddy	M.Tech.	NIT Surathkal	2024
2.	Bhaviripudi Kusuma Sri	MBA	IIM Sambalpur	2024
3.	Abhijeet Agrawal	PhD JRF	IIIT Naya Raipur	2024
4.	Sunkara Sai Nithin	M.Tech.	NIT Rourkela	2024
5.	Nishant Wankhede	M.Tech	IIT Delhi	2024

DEPARTMENTAL ACTIVITY

ECE Lecture Series

The ECE Department hosted a session on 09th July 2024 as part of its ECE Lecture Series, featuring esteemed alumni Ambuj Mishra, a Product Manager at Flipkart. He shared insights on critical skills for success in the tech landscape, emphasizing the concept of "value" as providing products that meet customer needs at an acceptable price.



Ambuj discussed identifying market gaps to develop valuable products and engaged the audience in introspective exercises on failure, personal shortcomings, and conflict resolution. He highlighted essential soft skills for employability and outlined the hard skills needed in core electronics and tech sectors.

He also addressed the role of Artificial Intelligence in enhancing prediction accuracy and its applications in areas like ad-tech. Ambuj explained the responsibilities of a product manager, focusing on delivering customer value while meeting business objectives. He underscored the importance of final year projects in showcasing skills to prospective employers.

The session concluded with a lively Q&A, where students posed thoughtful questions about career paths and skill development. The ECE Department thanks Ambuj Mishra for his valuable insights, reinforcing the importance of both hard and soft skills in the tech industry.

DEPARTMENTAL ACTIVITY

TEACHER'S DAY 2024

The Teachers' Day celebration organized by the students of the Electronics and Communication Engineering (ECE) department was a resounding success. The event was a tribute to the dedication and hard work of the faculty, featuring a series of performances, activities, and ceremonies that highlighted the students' appreciation for their teachers.



The event commenced with the traditional Guru Vandana, a ritualistic homage to the teachers. The students performed this meaningful segment to express their gratitude and reverence towards their mentors. Following the Guru Vandana, the stage was graced by an exquisite cultural dance performance. The performance received widespread acclaim from both students and faculty, setting a vibrant tone for the rest of the event. The spotlight then shifted to musical performances by the second-year students. A group of second-year female students took the stage next, performing an energetic group dance. Two solo dance performances followed, adding a dynamic flair to the event. Both performances were met with enthusiastic applause, highlighting the diverse talents within the student body.

The cake-cutting ceremony was a highlight of the event, symbolizing the celebration of Teachers' Day. A series of entertaining games and activities were organized for the faculty members. The tasks included singing performances and various fun challenges that allowed the teachers to showcase their hidden talents and engage in light-hearted competition. The interactive activities added a playful and spirited element to the celebration. The final-year students exhibited their literary skills through poignant and expressive poetry performances. Refreshments were served to both students and faculty.

The event concluded with a meaningful plantation ceremony, symbolizing growth and the nurturing spirit of education. Students and faculty members planted trees together, leaving a lasting mark of their collective effort and commitment to a greener future.



THE FLIP FLOPS TEAM

For Suggestions write us at : ecenewsletter.ggv@gmail.com



DR. SOMA DAS
TEACHER COORDINATOR
HOD, ECE



GAURAV KUMAR
STUDENT COORDINATOR
Pre- Final Year



SIAMA NASEEM
CONTENT LEAD
Pre-Final Year



RITIK K ARORA
CONTENT MEMBER
Pre-Final Year



ASTHA SHUKLA
CONTENT MEMBER
Second Year



FAHAD AHMAD
CONTENT MEMBER
Second Year



JAHNVI SRIVASTAVA
CONTENT MEMBER
Second Year



TANISHA BHUSHAN
GD LEAD
Pre-Final Year



SHASHANKA MANDAL
GD MEMBER
Pre-Final Year



**PRABHAKAR KUMAR
CHOUHARY**
GD MEMBER
Second Year



SUDHANSHU KUMAR
GD MEMBER
Second Year



ARYA PATEL
GD MEMBER
Second Year

Published By
**DEPARTMENT OF
ELECTRONICS & COMMUNICATION ENGINEERING**

**Guru Ghasidas Vishwavidyalaya
Bilaspur, Chhattisgarh**