THE
FLIP FLOPS
A QUARTERLY ECE NEWSLETTER
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Department of Electronics & Communication Engineering
School of Studies in Engineering and Technology
Guru Ghasidas Vishwavidyalaya, Bilaspur, (C.G.)

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From The Desk Of Hon'ble Vice-Chancellor

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-Flop. May this be the beginning of a new era of learning and innovation!

My best wishes and good luck to our upcoming engineers!

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

Greetings From The Registrar

In the digital world that we now inhabit, tecnological 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 Shool 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 quaterly ECE newsletter "Flip-Flops" will contribute to all round growth of our exceptional human resources.

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

Message From The Dean, SoS (E&T)

"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-Flop 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.

Prof. S. C. Srivastava
Dean, SoS (E&T)
Guru Ghasidas Vishwavidyalaya

Ambition Of The HOD

The Electronics and Communication Engineering (ECE) department is dedicated to fostering the academic and 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 the industry.

I extend a warm invitation to recruiters and our 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 students to maximize their potential by gaining practical insights and experience.

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

Student Article

Nishant Wankhade

MTech IIT Delhi

Hi Fellow Juniors,

I am Nishant Wankhade, and I've recently taken admission to IIT Delhi, where I'll be pursuing M.Tech. in Robotics. I'm excited to share how I prepared for the entrance exam that got me here. It all started when my friend Saiprasad told me about a new subject , DA, that was going to be added this year.

Instead of giving you the typical study tips, I want to share my personal preparation and story in this article. I began my serious preparation around September-October, right after I bought a course that seemed like a good fit for me. The course I took was from PW's GatemWallah. It was affordable and seemed like a good match for what I needed

I have to admit, my preparation wasn't always consistent. Like many others, I started off with a lot of enthusiasm, putting in 4-5 hours a day. But as time went on, I began to lose steam and ended up studying for about 2 hours daily. Despite this, I found a method that worked well for me. When tackling new topics, I made sure to understand them thoroughly first and then practiced solving standard problems related to them.

One thing that really played in my favour was the exam syllabus. A lot of the topics were things I had already covered during my college semesters, like Probability Theory, Random Processes, and Basic DSA. Additionally, participating in contests helped keep my logical skills sharp.

In the final days leading up to the exam, strategizing became crucial. I focused on figuring out the standard questions that are usually asked by analyzing the sample paper provided by the GATE organizers. Since this was the first time the exam was being held, that sample paper was the only real reference I had.

I was fortunate that the hard work I put in during semester exams and contests paid off during the entrance exam. I want to make sure my advice is clear and actionable, so here's what you should give a thought to:

- **First and foremost, know your syllabus inside out.** Understanding the syllabus thoroughly helped me focus on the most important areas and prioritize my efforts.

- It's also **crucial to plan your study schedule realistically.** Don't set overly ambitious goals like finishing three chapters in a week with the idea of completing an entire subject inthree weeks. Instead, break down your syllabus into manageable parts and create a weekly plan that you can stick to.

- **Always plan your study sessions in advance.** For example, if you're going to study for two hours, decide beforehand what specific topics you'll cover, what you'll learn, and what problems you'll practice. This kind of strategic planning, especially in the final days before the exam, really made a difference for me

- **Always plan your study sessions in advance.** For example, if you're going to study for two hours, decide beforehand what specific topics you'll cover, what you'll learn, and what problems you'll practice. This kind of strategic planning, especially in the final days before the exam, really made a difference for me.
- Finally, focus on solving the important standard problems for the topics you cover. You don't need to solve every single problem out there - just do enough to cover what's necessary for the exam. **Quality over quantity is key.**

> "Baaki tumlog kar loge thoda time dena padta hai bas"

> "The best time to plant a tree was 20 years ago. The second best time is now" - Even if you regret not having planted a tree, it is still worth doing so.

~Nishant Wankhade

Physical Layer Security in Wireless Communication Systems

Deepak Kumar
Assistant Professor

Introduction

Physical layer security (PLS) has become a promising frontier in securing wireless communication systems. Unlike traditional cryptographic methods that rely heavily on algorithms at application layer, We exploits the physical characteristics of wireless channels to provide security at physical layer. By leveraging the physical properties of the wireless medium, it offers a complementary approach to traditional cryptographic techniques. As wireless networks continue to evolve, integrating PLS will be crucial in ensuring the confidentiality, integrity, and authenticity of transmitted data in an increasingly connected world. Ongoing research and development will be essential in overcoming existing challenges and enhancing the robustness of PLS methodologies.

Concepts and Principles: At its core, PLS leverages the inherent properties of the wireless medium to enhance security. The fundamental idea is that the characteristics of wireless channels—such as fading, noise, and interference—can be utilized to obscure the information being transmitted from unauthorized eavesdroppers. By ensuring that the legitimate receiver (the intended user) can successfully decode the message while the eavesdropper (the unauthorized user) cannot, PLS establishes a new layer of security.

Key principles:

1. **Jamming**: A Jammer transmits the artificial noise (AN) to disrupt the communication between legitimate users and base station. It tries to minimizing the legitimate system achievable data rate. Since jammer may transmit continuously (in uplink and downlink), it affects the channel estimation process hence can severely degrade the performance of wireless communication system.

2. **Eavesdropping and Secrecy Capacity**: A Eavesdropper silently listens to the communication between legitimate users and BS. One of the important metrics to measure the efficiency of eavesdropper is the secrecy capacity. The secrecy capacity is defined as the maximum achievable secrecy rate. Let the secrecy rate Cs is the amount of information that can be sent reliably and confidentially, then it is mathematically defined as Cs= [Cm-Ce] +, where Cm and Ce denotes the achievable rate of the legitimate users and the eavesdropper.

3. **Cooperative Relaying**: This involves using multiple antennas or relay nodes to enhance the signal quality for the legitimate receiver while simultaneously degrading the reception quality for the eavesdropper. Techniques like decode-and-forward or amplify-and-forward are commonly employed.

4. **Artificial Noise**: Adding artificial noise to the signal can mask the transmitted information from potential eavesdroppers. This technique ensures that even if the eavesdropper intercepts the signal, it remains unintelligible.

Challenges and Solutions

Despite its promise, implementing PLS in wireless communication systems presents several challenges:

> **Channel Variability**: Wireless channels are inherently unpredictable, which can complicate the maintenance of secrecy.

> **Eavesdropping Capabilities**: As technology advances, eavesdroppers may gain sophisticated tools to intercept signals, necessitating constant innovation in PLS techniques.

> **Mobility**: The mobility of users in wireless networks can affect the reliability of secure communication.

Campus Plantation Drive

The Electronics and Communication Engineering (ECE) department at our campus recently organized a successful plantation drive on 8 April 2024, marking a significant step towards enhancing environmental sustainability. This initiative, guided by the visionary leadership of Dr. Soma Das and Ms. Anita Khana, saw the campus flourish with the addition of 350 thriving plants.

The success of this green initiative was largely due to the active participation and unwavering commitment of the second and third-year students from the ECE department. Their dedication and enthusiasm were instrumental in the smooth execution of the event, showcasing the importance of student involvement in such ecological efforts.

Furthermore, all professors from the ECE department actively participated in the drive, reinforcing their commitment to fostering a greener campus and setting a powerful example for the students.

The plantation drive stands as a testament to the ECE department's commitment to environmental sustainability and serves as an inspiration for other departments and institutions to undertake similar initiatives. By fostering a greener campus, the department has taken a commendable step towards creating a healthier and more sustainable future for all.

ELECTRONEXUS

ELECTRONEXUS, a three-day event organized by Silicon GGV and IEEE GGV, brought together experts and enthusiasts from the fields of technology and healthcare to explore the transformative impact of artificial intelligence (AI), machine learning (ML), and advanced materials. The event delved into the latest advancements that are reshaping industries, particularly healthcare, by merging cutting-edge technology with medical science. Each day focused on a different aspect of this technological revolution, providing participants with valuable insights and practical knowledge.

Day 1:

The journey began with a focus on the revolutionary role of Computer Intelligence in healthcare. Dr. Prabira Kumar Sethy, an Associate Professor in the ECE department, led a compelling session on how AI, deep learning, and machine learning are transforming cancer diagnosis. He emphasized the seamless integration of these technologies with medical science, particularly in the early detection of cancer through sophisticated data analysis. Dr. Sethy's insights highlighted the critical role of advanced technologies as key allies in the fight against cancer. He also underscored the importance of collaboration between technology experts and healthcare professionals to achieve more accurate and timely diagnosis, ultimately benefiting both patients and practitioners.

Day 2:

On the second day, the spotlight shifted to the broader applications of AI and ML in various fields. Sir Jitendra Bharadwaj captivated the audience with a discussion on the fundamental differences between knowledge and intelligence, linking these concepts to computer systems. He explored how AI and ML are transforming industries by processing vast amounts of data and deriving actionable intelligence from it. The session demonstrated the incredible potential of these technologies to solve complex problems and drive innovation across different sectors.

Day 3:

The final day of ELECTRONEXUS introduced participants to the fascinating world of metamaterials. Nipun Mishra led a session on how subtle changes in properties like permittivity and permeability are revolutionizing industries and everyday life. He discussed the transformative potential of metamaterial absorbers, which can detect and distinguish between different types of matter by absorbing various electromagnetic waves. Additionally, Shrey Sandiman provided hands-on guidance on designing these absorber materials using CST software. This session empowered participants to engage n innovation, highlighting how technology can be democratized to invite diverse contributions to the metamaterial revolution.

Conclusion:

ELECTRONEXUS concluded successfully after three days of rich knowledge-sharing and exploration. Hosted by Silicon GGV and IEEE GGV, this impactful event showcased their strong commitment to advancing technology and innovation in healthcare and beyond. Each session provided valuable insights and practical tools, leaving participants inspired and equipped to contribute to the ongoing technological revolution.

TRADITIONAL DAY
Celebrating Unity at ECE Department

On April 12th, 2024, the ECE Department hosted a Traditional Day that beautifully blended nostalgia and unity. This memorable gathering brought together first-year enthusiasts, seasoned seniors, and esteemed faculty members, creating a vibrant atmosphere filled with joy and camaraderie.

The event's success was made possible by the dedicated efforts of Sumit Kumar Gupta Sir, Dr. Anil Kumar Soni, Praveena Rajput Ma'am, and the dynamic students Vikas Jonwal (Final year), Deependra Kumar (Final year), and Gaurav Kumar (Second year). Their meticulous planning and hard work ensured that every aspect of the day was perfect.

Throughout the day, participants engaged in joyous rituals and activities that highlighted our rich traditions. The atmosphere was filled with heartfelt camaraderie as we celebrated our roots. One of the day's highlights was capturing timeless moments with our HoD and faculty members, creating lasting memories that we will cherish for years to come.

This wonderful event was the result of the hard work and dedication of SILICON-GGV, IEEE-GGV, and the esteemed professors of the ECE Department. Their efforts in organising and conducting such a beautiful and memorable day allowed everyone to come together, celebrate our journey, and build lasting bonds.

This celebration was a reflection of our traditions and a reminder of the strong sense of community and unity that defines our department.

TEACHER'S ACHIEVEMENT
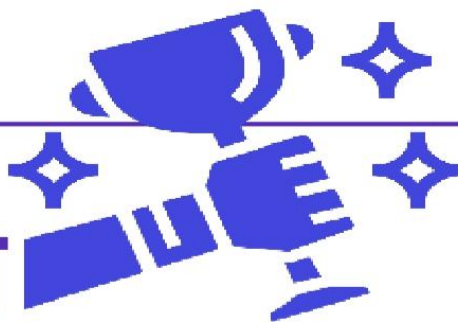
- Dr Soma Das and Sumit Kumar Gupta have published a Scopus index Journal with the title "Triple notched MIMO antenna for S and C band applications" in "Journal of Electronics letters", under Tailor and Francis Group in May 2024.

- Dr. Prabira Kumar Sethy delivered an expert lecture in "one week short-term course" titled "Advances in Signal Processing, Communication, and VLSI Design (ASPCV-2024)" organized by the Department of Electronics and Communication Engineering at NIT Delhi during 22-27 April.

- Dr. Prabira Kumar Sethy has published a paper entitled "Automated Classification of Indian Mango Varieties Using Machine Learning and MobileNet-v2 Deep Features" in "Journal of Traitement du Signal". Published date-30 April, 2024; Volume. 41, No. 2, pp.669-678.

- Dr. Prabira Kumar Sethy delivered a keynote speech entitled "Image Recognition via Deep Learning" at the 2024 International Conference on Modeling, Natural Language Processing, and Machine Learning (CMNM 2024) on May 18, 2024.

- Dr. Prabira Kumar Sethy has published a paper entitled "Enhancing oral squamous cell carcinoma detection: a novel approach using improved EfficientNet architecture" in "Journal of BMC Oral Health". Published date-23 May, 2024.

- Dr. Prabira Kumar Sethy and Dr. Manoj Gupta have published a paper entitled "Analytical Validation and Integration of CIC-Bell-DNS-EXF-2021 Dataset on Security Information and Event Management" in "Journal of IEEE Access", Vol 12, 2024, pp 83043-83056.

- Dr. Manoj Gupta has published a paper entitled "A context-aware energy saving information centric (CAES) model for wireless communication network" in "Journal of Engineering Research (Elsevier), May 2024".

- Dr. Manoj Gupta has participated as keynote speaker in " 1st International Conference on Multidisciplinary Research", Shinawatra University, Pathum-Thani, Thailand on Dated May 16, 2024.

- Dr. Nipun Mishra and Shrey Kumar a Ph.D. Scholar delivered an expert lecture in "Three day Electronexous Workshop" titled "Metamaterial" jointly organized by the "IEEE Student Chapter GGV" and the "Silicon Society GGV" during 15-17 April, 2024.

- Dr. Pankaj Shankar Shrivastava has participated and presented a paper on "SNR Dynamics in Orthogonal Systems: Distance, Noise, and Power Optimization" in the 5th Online\Offline Mega "International Conference on Continuity, Consistency and Innovation in Applied Science and Humanities" (ICCIASH), organized by Department of Freshmen Engineering of St. Martin's Engineering College, Dhulapally, Secunderabad, Telangana, India on 19th & 20th June, 2024.

- Dr. Pankaj Shankar Shrivastav has participated and presented a paper on "Analysis of Millimeter Wave On Different Bands For Wireless Communication And Applications" in the 5th Online\Offline Mega "International Conference on Continuity, Consistency and Innovation in Applied Science and Humanities" (ICCIASH), organised by Department of Freshmen Engineering of St. Martin's Engineering College, Dhulapally, Secunderabad, Telangana, India on 19th & 20th June, 2024.

- Dr. Pankaj Shankar Shrivastav has participated and presented a paper on "Investigating the Dynamics of Spectral Efficiency: Impact of Delay and Doppler Shift for OTFS system" in the 5th Online\Offline Mega "International Conference on Continuity, Consistency and Innovation in Applied Science and Humanities" (ICCIASH), organized by Department of Freshmen Engineering of St. Martin's Engineering College, Dhulapally, Secunderabad, Telangana, India on 19th & 20th June, 2024.

- Dr. Sudakar Singh Chauhan granted a patent entitled "Two-Dimensional In-Line Semiconductor Device" in Patent Office Journal No. 27/2021 dated April 10, 2024 under section 11A of the Indian Patents Act, 1970.

- Dr. Sudakar Singh Chauhan served as a Session Chair in "1st International Conference on Recent Advances in Smart Energy Systems & Intelligent Automation (RASESIA-2024)" organized at NIT Kurukshetra During June 14-15, 2024.

- Dr. Sudakar Singh Chauhan delivered an Expert Lecture on Energy Efficient Low Power VLSI Devices for 5G & 6G Technology in one-week STC on 5G/6G Wireless Technologies (WT-2024) organized by NIT Kurukshetra, 17 April- 21 April, 2024. (18 April 2024).

- Mrs. Anita Khanna has published a paper entitled "Content Base Image Retrieval System Using CNN based Deep Learning Models" in "Journal of ELSEVIER B.V.", Published date-April, 2024.
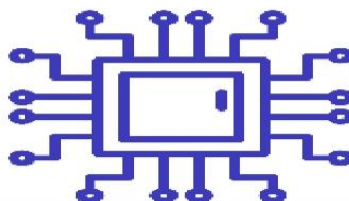
Student's Achievement

- Adityam Kumar Sharma, Astha Shukla, and Bhawna Sahu participated in SUSTAIN-A-THON 2024, a Sustainability Hackathon by Indian Oil Corporation Ltd.

- Astha Shukla participated in the "Samsung Solve For Tomorrow" hackathon.

- Astha Shukla participated in the "Google Solution Challenge".

- Kush kumar participated in SUSTAIN-A-THON 2024, Sustainability Hackathon by Indian Oil Corporation Ltd.

- Kush completed the six-week Summer Analytics 2024 course, an introductory program on Data Science and Machine Learning organised by the Consulting & Analytics Club of IIT Guwahati.

- Shreya Singh completed a month-long internship in ML and IOT with IBYD Technologies Pvt Limited in hybrid mode from May 25, 2024, to June 25, 2024.

- Tanisha Bhushan completed her internship with the "Top Trove Foundation" as a VOLUNTEER INTERN in June 2024.

- Tanisha Bhushan completed her vocational training with BSNL Pvt Ltd from 20-05-2024 to 18-06-24.

Campus Placement for Batch 2024

The campus placement drive for the Class of 2024 has been successful, with students securing positions in renowned firms across various industries. Our placement cell and faculty provided support to the graduates to secure positions for themselves.

Name Of The Company	The number of students placed	Average Salary Per year
Tractrix Opto Dynamics	03	4.8 LPA
Dhoot Transmission	11	2.14 LPA
High-Technext Engineering	03	2.76 LPA
ACB India Ltd	01	4.15 LPA

Summer Internships

The summer internship program for pre-final year students was a success, with participants gaining valuable experience across various industries. These internships allowed students to apply their academic knowledge in real-world settings and provided professional growth and networking opportunities.

Company name	No of the Students who bagged an Internship
BSNL	2
Vizag Steel Plant, Vishakapatnam	2
AD Infocom Systems	1
Chip ELections Training Institute, Vijayawada	1
NIT Patna	1
Hasdeo Thermal Power Plant Station , Korba	1
NIT Raipur	1
Railways	15
MSME Durg	5
NIT Tadepalligudem, Andhra Pradesh	1
SAIL(BSL)	1
IBYD Technologies Pvt LTD	1
Bharat Heavy Electricals Limited(BHEL)	14
Bharat Electronics Limited, Center for learning and development	1
SECR, Bilaspur	3
Rashtriya Ispat Nigam Ltd, Vizag Steel Plant	1

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