The ECE Edge

...Departmental Newsletter

Vol.1, June 2024

Electronics & Communication Engineering, NIT Silchar

VISION

The Vision of the Department of Electronics and Communication Engineering, National Institute of Technology Silchar is to be a model of excellence for undergraduate and post-graduate education and research in the country.

MISSION

The mission of the Department of Electronics & Communication Engineering, National Institute of Technology Silchar, is to prepare our graduates to begin a lifetime of professional creativity and leadership.

From the desk of Head of Department

Dr. Koushik Guha
HOD, ECE

National Institute of Technology Silchar is recognized as one of the premier institutes in the country. The **Department of Electronics and Communication Engineering** at NIT Silchar has made significant contributions across various fronts. Since its inception, the department has consistently made impactful strides in both social and economic spheres. Its achievements have been widely acknowledged by prestigious national and international institutions and organizations. The UG program along with various PG programs offered by the department is accredited by the NationalBoard of Accreditation (NBA), Government of India. The department has been a regular recipient of research grants from national and international funding agencies.

Additionally, in line with the nation's burgeoning startup ecosystem, the department has initiated efforts to foster entrepreneurship-from-academics, exemplified by initiatives like the **MEITY funded Chip-to-Startup project, Govt. funded 5G Use case lab, etc.**

This newsletter, "The ECE Edge," is published with the intent to showcase to a diverse audience of students, academicians, researchers, and industry professionals, the wealth of knowledge, and the nurturing environment for ideas and innovations that the Department of Electronics and Communication Engineering at NIT Silchar embodies. I welcome the readers to explore more about our department in our official website: http://ec.nits.ac.in/.

From our distinguished alumni

Prof. Kolin Paul
IIT Delhi

REC Silchar (now **NIT Silchar**) and the **Department of Electronics and Telecommunication Engineering (ETCE)** hold a very dear place in my heart and mind because they laid the foundation for where I stand today. During the last three and half decades, I have seen the Department grow in stature. I deeply admire the faculty who taught me (albeit many of them have left the Institute today). Some of the current senior faculty have admirably managed to inspire and lead the younger faculty. and hence I see a lot of potential in the people and students who currently are part of the Department. I am very proud of the fact that I am Rexian who learnt a lot in the corridors and Labs of ETCE@RECS and always shall remain eternally grateful for the love and affection that I get whenever I visit RECS(NITS).

Professor Kolin Paul, is at present serving at IIT Delhi as a professor in computer science and engineering. He was awarded Bachelors degree in Electronics and Communication engineering, (then) REC Silchar in 1992. He has been closely associated with his alma mater since then. His illustrious career spanning over industry as well as academics, makes him one of the most distinguished alumnus of Dept. of ECE NIT Silchar (then REC Silchar).

We wholeheartedly thank Prof. Kolin Paul for his kind words of encouragement.

Faculty members of the department

The Department of Electronics & Communication Engineering offers a four-year B.Tech. program and two-year M. Tech. programs and Ph.D. in various areas of the discipline. The faculties of the department have a wide variety of expertise with a strong academic background and are alumni of reputed institutes around the world.

Prof. Fazal Ahmed Talukdar
Professor (HAG)

Prof. Krishnalal Baishnab
Professor.

Dr. Wasim Arif
Associate Professor.

Dr. Ashraf Hussain
Associate Professor.

Dr. Taimoor Khan
Associate Professor.

Dr. Arnab Nandi
Associate Professor.

Dr. Prabina Pattanayak
Assistant Professor.

Dr. P. Pushpa Devi
Assistant Professor.

Dr. Tripti Goel
Assistant Professor.

Dr. Bijit Choudhuri
Assistant Professor.

Dr. Rajesh Saha
Assistant Professor.

Prof. Srimanta Baishya
Professor (HAG)

Prof. Rabul H. Laskar
Professor.

Dr. Koushik Guha
Associate Professor.

Dr. Ram Kr. Karsh
Assistant Professor.

Dr. Banani Basu
Associate Professor.

Dr. Ujjal Chakraborty
Associate Professor.

Dr. R. Murugan
Assistant Professor.

Dr. Gaurav Singh Baghel.
Assistant Professor.

Dr. Denvendra Singh Gurjar.
Assistant Professor.

Dr. Arun Kumar
Assistant Professor.

Dr. Sucharita Chakraborty
Assistant Professor.

Dr. Madhumita Paul
Associate Professor.

Prof. Brinda Bhowmick
Professor.

Dr. Trupti Ranjan Lenka
Associate Professor.

Dr. Ganesh Prasad
Assistant Professor.

Dr. S.K.Tripathy
Associate Professor.

Dr. Chandrajit Choudhury
Assistant Professor.

Dr. Kavicharan Mummaneni
Assistant Professor.

Dr. M.V. Swati
Assistant Professor.

Mr. Anupal Deka.
Trainee Teacher.

Dr. Himanshu Karan
Assistant Professor.

Dr. Dipjyoti Das
Assistant Professor.

Research & Development @ ECE, NIT Silchar

The ECE accommodates a diverse team of researchers, including 33 faculty members renowned for their strong academic and research credentials. With over 40 PhD scholars and more than 50 postgraduate (PG) scholars, the department fosters a robust research environment. Undergraduate (UG) students actively contribute to the department's research profile through projects and internships. The department also supports Vishveshwarya research scholars, Junior Research Fellows (JRFs), and Project Assistants involved in various sponsored projects. It boasts a notable record of high-impact publications and holds both national and international patents. The department's major research groups focus on a wide array of domains within Electronics and Communication Engineering.

Device Physics and Modelling:

- Micro/Nano-electronic Devices
- Compact modeling of Multi-gate FETs
- Machine learning based device modeling
- Circuit and Systems
- HEMT
- Non-Volatile Memory
- Statistical analysis of Reliability Issues

VLSI design:

- VLSI Testing & Verification
- VLSI Interconnects
- IC Design
- Algorithms to VLSI Architectures
- Digital, Analog & Mixed VLSI design & Tech.

MEMS/NEMS:

- Sensors and Actuators
- Lab on Chip
- Optimization
- Organ on Chip

Quantum Modeling:

- Quantum modelling & computing
- Neuromorphic computing

Energy/Storage Devices:

- Perovskite Solar Photovoltaics
- Renewable Energy
- Organic Electronic Devices
- Li-Ion Battery

Antenna Systems & Applications:

- Antenna and Antenna Array Design
- Dielectric Resonators & Applications
- Resonators for RF Applications
- Smart Antenna Systems
- Antennas for 5G Communications
- WBAN

RF Signal & Image Processing:

- Microwave Imaging
- RADAR Signal Processing.

Active & Passive Microwave Devices:

- MEMS & MMIC Technologies
- RF Energy Harvesting Systems
- Metamaterials
- EBG and FSS Structures
- mm-Wave/Terahertz Devices
- Microwave & mm-wave Structures
- High Power Amplifiers & Oscillators

Communication Engineering:

- 5G/6G Wireless Communication Technologies
- IRS Assisted Communication
- UAV Enabled Communication
- RF Energy Harvesting
- FSO and Underwater Communication
- Optical Fibre Communication

Machine Learning and Artificial Intelligence:

- Robotics
- Image processing
- Medical imaging

Signal Processing:

- Speech Processing
- Image and Video Processing
- Bio-medical Signal and Image Processing
- Multimedia Authentication
- Computer Vision
- Neuroimaging
- Computer Aided Diagnosis

Soft Computing:

- Optimization Techniques
- Convex Optimization
- Heuristic Optimization techniques

5G Use Case Lab (DoT, Gov. of India)

Under the leadership of honorable prime-minister Shree Narendra Modi, the DoT has built 100 5G-use-case labs in various higher education institutions across India to build competencies and engagement in 5G technologies for students, research scholars and start-up initiative,.
We, Department of Electronics and Communication Engineering (ECE) at NIT Silchar, proudly state that we have been selected for establishing one of these 100 state-of-the-art 5G labs.

The Features and Purpose of the Lab are:

* **Exclusive access to State-of-the-Art Equipments** related to 5G technologies such as 5G SA infrastructure, Dongles, IoT Gateway, Router, Application Server, Management Dashboard.
* **Cutting-edge Research Opportunities** for academic research projects (UG and PG).
* **Academia-industry collaboration** for technology ready innovations, inventions & applications.
* **Technical as well as R&D Support** for local startups and MSMEs.
* **Future-Ready:** Building academic competencies & nurturing startup ecosystem for 6G.
* **Providing a platform to Research scholars** where they will have access to cutting-edge 5G technology, enabling them to conduct pioneering research in communication.

DST FIST Grant (Gov. of India)

Department of ECE, NIT Silchar has received DST FIST grant for five years (2024-2029) of amount **INR1.28 Crores**. The key objectives for FIST project are listed below:

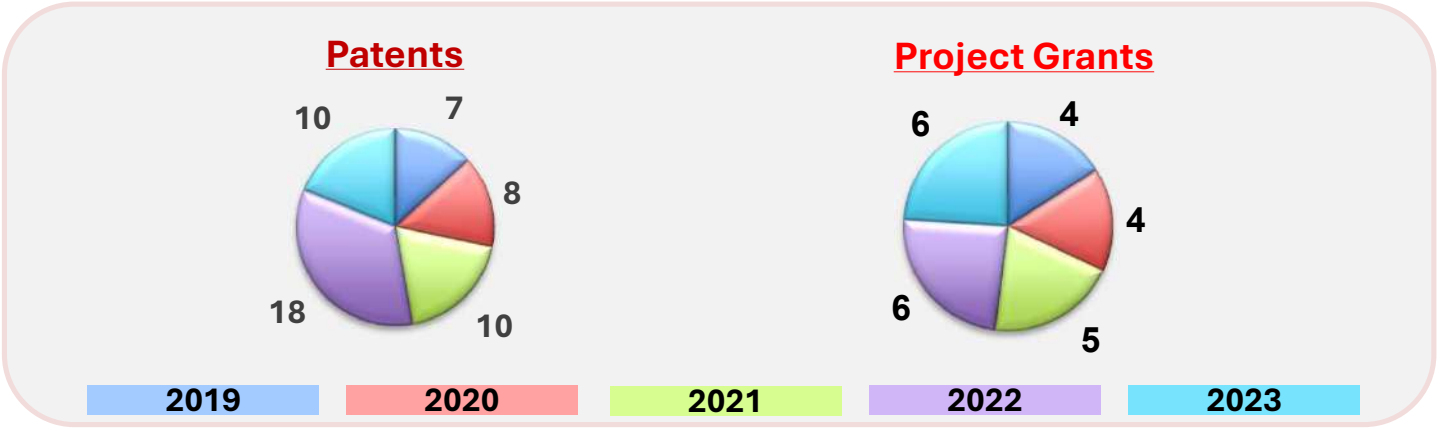
* **Design of surface plasmonic nanoparticle sensitized Schottky Barrier photodetector for application in visible and UV wavelength range.**
* **Growth of TiO_2, ZnO, and Ga_2O_3 active material based photodetector.**
* **Optical and electrical characterization of the photodetector to observe its optoelectronic properties.**
* **Optimization of the device dimensions and morphology based on the device performance analysis.**
* **Fabrication and prototype development of the proposed device.**

Equipment like Electron Beam Evaporation System, I-V measurement system, Laboratory Fume-hood with Filter, Monochrometer, Optical Power Meter, Photoluminescence measurement system, Thermal Furnace, UV-Visible Absorption Spectrophotometer will be purchased under this project.

Chip-to-Startup (MEITY, Gov. of India)

Department of ECE has been awarded a grant of **INR 1.1 Crores,** under the Chip-to-Startup (C2S) initiative of Ministry of Electronics and Information technology, Gov. of India. The project has been granted for **5 years (2023-2028),** under the investigation of **Prof. K. L. Baishnab** and **Dr. Koushik Guha,** of ECE department. The key objectives of the project is: "**Design of low power low latency non-invasive seizure detection system"**.

Research Statistics (last 5 years)



MoU's with National and International institutes.

Our department is working to collaborate with various National & International Institutes. Our efforts have resulted in collaborations and signing of MoU's with the following institutes of international repute:

International Collaborations:

- Fondazione Bruno Kessler, Italy.
- Tyndall National Institute, Ireland.
- NUS, Singapore; SERIS, Singapore.
- New Jersey Institute of Technology, USA.
- Queens University, Canada.
- University of Saskatchewan, Canada.
- Norwegian University of Science and Technology, Norway.
- University of Nis, Serbia.
- University of Belgrade, Serbia.
- Slovak Academy of Sciences, Slovakia.
- Purdue University, USA.
- Imperial College London, UK.
- University of Malaysia, Perlis.
- University of Augsburg, Germany.
- Tyndall National Institute, Ireland.
- Khalifa University of Science, Technology and Research, UAE

National Collaborations:

- IIT Kharagpur.
- IIT Kanpur.
- IIT Guwahati.
- IIT Madras.
- IIT Delhi.
- IIT Indore.
- IIT BHU.
- IIT Dharwad.
- IIT Patna.
- IIT Roorkee.
- Jadavpur University.
- CSIR-CEERI Pilani.
- IIEST Shibpur.
- IIIT Allahabad.
- MNIT Jaipur.
- Tezpur University.

Laurels earned by our Students

The show-stealer of 2023 was the hackathon team of ECE students:
(from the left) **Sourjya Mukherjee, Agneesh Dasgupta, Diya Karmakar, Manish Sarmah, Biju Borah** and **Shayan Debroy.**

Their ground breaking innovation **"FloodSafeGIS"** won the **Smart India Hackathon 2023**.
The team was mentored by **Dr. Wasim Arif, ECE** Dept.

Heartiest congratulations to the team!

Vishnu Padmakumar,
B.Tech., 3rd year, Dept. of ECE

Won the prestigious DAAD-WISE scholarship!

The work done under B.Tech. final year project of the group: **Sougoto Das, Shubham Kumar, Harshit Kumar** and **Arnob Sarker Nobo, (**mentored by **Dr. Chandrajit Choudhury)** has been filed as Indian Patent, January 2024.

Remarkable Performance of our students in GATE 2024...

2024 pass out batch:

Chayandeep Chakraborty
AIR: 189

Maithilee Deshpande
AIR: 557

Amogh Prabhu
AIR: 764

2024 final year batch:

Bhisetty S. L. S. Sarva Lokesh
AIR: 142

Bhargab Raj Gogoi
AIR: 479

Awards & Achievements (faculties)

Fellowship from National Scholarship Programme of the Slovak Republic by Govt. of Slovakia conferred to "Dr. Devendra Singh Gurjar" on 2024.

Dr. Devendra Singh Gurjar receives **best paper award in the IEEE ANTS-2023.**

Dr. Tripti Goel receives the **Indian National Science Academy, visiting scientist award, 2023**.

Dr. Banani Basu receives invitation to the **Inaugarial Asean-India Women Scientists Conclave (AIWSC), Singapore**, 2023.

Dr. Rajesh Saha enlisted in **top 2% scientist** in the world list.

Dr. Taimoor Khan receives **IETE fellowship**

Dr. Koushik Guha receives **IETE fellowship**

Dr. Trupti Ranjan Lenka receives **IETE fellowship**

Dr. Koushik Guha receives **IETE RS Kandpur award, 2022**

Visvesvaraya Young Faculty Research Fellowship by MeitY Govt of India conferred to "Prof. Brinda Bhowmick" & "Dr. T.R.Lenka".

Dr. Prabina Pattanayak, Dr. Koushik Guha & Dr. T.R.Lenka received the best faculty award in the year 2022, 2021 & 2019 respectively.

FDP's Organized

- **Communication, Signal Processing and Advance Technologies For Next Generation Applications**, *Funding Agency: BBIT, Kolkata, India, 20-24 November, 2023.*
- **BootCamp on Drone Skill Development & Entrepreneurship Training Programme**, *Funding Agency: MEITY, October, 2023.*
- **Recent advancement in wireless communication and signal processing,** *Funding Agency: BBIT, Kolkata, India, 12-16 September, 2022.*
- **Research Avenues in Machine Learning and AI for Societal Issues,** in collaboration with Computer Science and Engineering Department, *Funding Agency: AICTE, India, 14-18 March 2022.*

Conferences Organized

The Department, in association with IEEE EDS NIT Silchar Student Branch Chapter and IEEE Nanotechnology Council Chapter, organized the 4th International Conference on Micro and Nano Electronics Devices, Circuits, and Systems (MNDCS) 2024 from January 29th to 31st, 2024. The conference featured three tracks of Microelectronics and Nanoelectronics: Device, Circuit, and Systems.

The Department organized IEEE International Conference on Signal Processing and Computer Vision (SIPCOV-2022) during 30-31 March 2023. The conference featured four tracks of Signal, Image, and Video Processing; Medical Imaging and Technology; Communication System Engineering; and IoT Based System Design.

IEEE SILCHAR SUBSECTION

IEEE KOLKATA SECTION

2023 IEEE SILCHAR SUBSECTION CONFERENCE

(IEEE SILCON-2023)

November 3-5, 2023 (Hybrid Mode)

Venue: National Institute of Technology Silchar

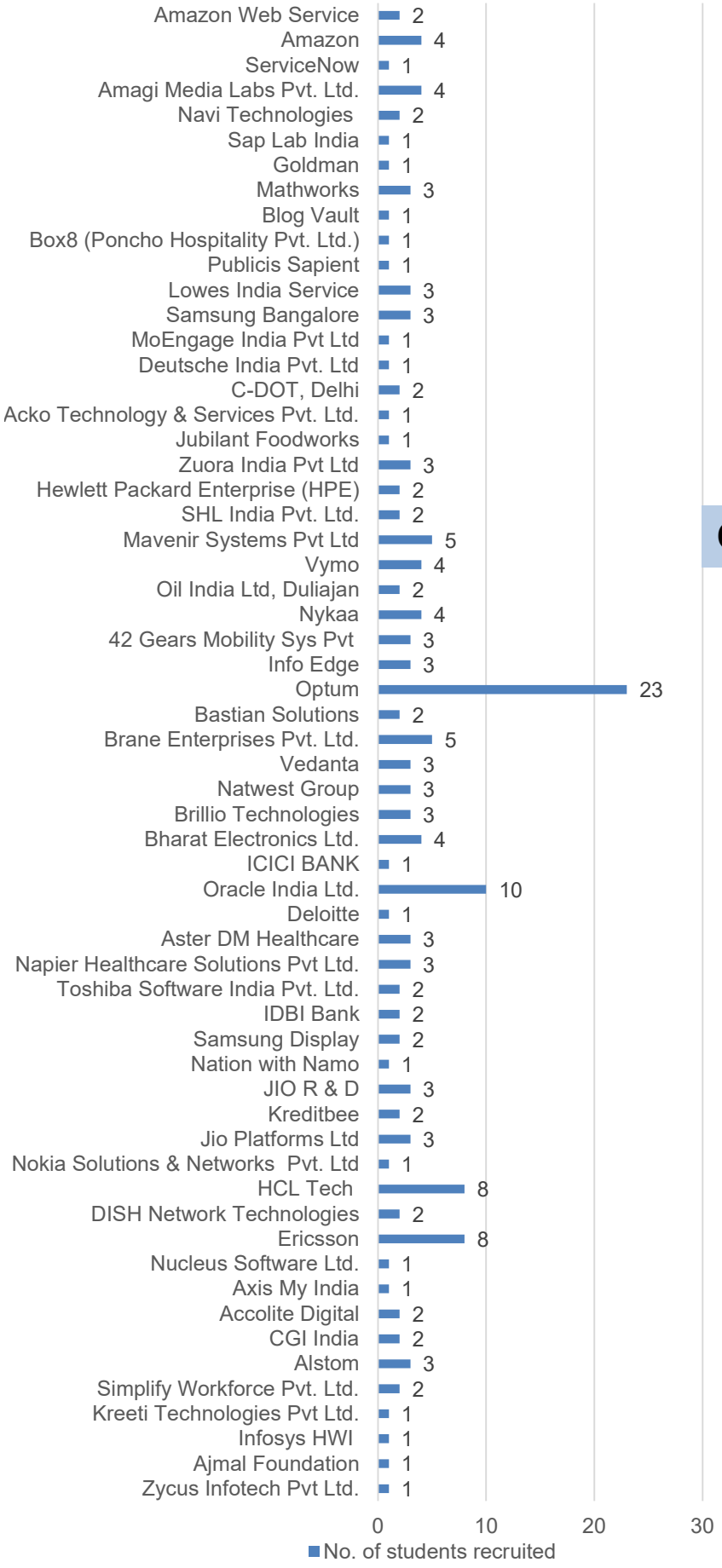
The Department hosted IEEE SILCON 2023, a flagship international conference of the IEEE Silchar. The conference covers all technical areas related to IEEE and provides a common platform for researchers, academicians, professionals, industry delegates, and students from the region to exchange ideas, share knowledge, and foster collaboration.

Workshops Organized

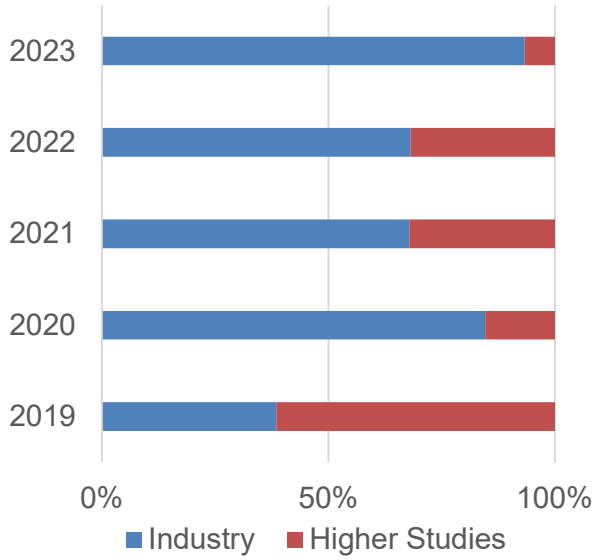
- **Futuristic Trends in Microwave and Millimeter Wave Technologies: An ML Approach FMMT (2023),** *1-7 June 2023.*
- **Hands-on Training and Workshop on Computational Biology and Bio-Medical Informatics,** *25-31 July 2022 .*
- **Role of Artificial Intelligence in Bio-Medical and Health Informatics (RAIBHI-2022)**, *5-11 April 2022.*
- **Prototype/Process Design and Development Prototyping,** *14-18 Feb. 2022.*
- **Recent Trends in Nanotechnology and Nanoelectronics: Devices, Circuits, and Systems perspectives**, *01-05 Sept 2021.*
- **2021 IEEE Electron Devices Society (EDS) Summer School,** *01-05 Sept. 2021.*
- **IEEE Sponsored International Workshop on Optimization and Intelligence in Electronics Engineering Applications (IEEE OIEEA-2021)**, *26-30 July 2021.*

Placement Statistics

Company wise ECE students recruited



P.G. Student placement statistics



Our Recruiters

IEEE Student branch chapters...

The department of ECE proudly hosts the chapters and activities of...

- **IEEE Electron Device Society Student Branch Chapter (SBC)**
- **IEEE Nanotechnology Council**
- **IEEE Communication Society SBC**
- **IEEE Antenna and Propagation Society SBC**
- **IEEE Women in Engineering Affinity Group**
- **IEEE Silchar Sub Section**
- **IEEE Microwave Theory and Techniques SBC**
- **IEEE Signal Processing Society**

ECS Society

THE ELECTRONICS AND COMMUNICATION SOCIETY (ECS)

The Department of Electronics and Communication Engineering (ECE) at NIT Silchar has been dedicated to nurturing the comprehensive growth of its students from its inception. The ***Electronics and Communication Society***, an integral part of the department, is deeply rooted within its community. This society enthusiastically participates in a wide array of extracurricular activities. Known for its lively and dynamic atmosphere, the EC Society plays a pivotal role in fostering a competitive overall skill set among our students. This is achieved through customized events, workshops, seminars, hands-on sessions, and more, aimed at enhancing aptitude and personality development. Dr. Wasim Arif is the faculty advisor for ECS society.

- **Events:** ECS hosts a variety of events that foster participation, innovation, and collaboration among students, enhancing both technical and non-technical skills. Key events include:
  - **SPECTRUM**: An annual freshers' week that helps new students integrate into the department.
  - **SPECTRUM FIT:** A sports week dedicated to promoting physical fitness and teamwork.

- **Talk Sessions:** ECS organizes insightful talk sessions featuring distinguished professors, successful alumni, and exceptional seniors.
- **Newsletter:** The annual newsletter, **SPECTRE**, keeps students informed about departmental news & activities, technological advancements, and various opportunities for growth and learning.
- **Classes and Learning Sessions:** ECS offers supplementary classes and learning sessions to help students deepen their understanding of core subjects through a teaching learning process, and stay abreast of emerging technologies. These sessions encompass various topics such as software programming, Arduino training, and Android development.
- **Talent Promotion:** ECS provides platforms for students to showcase their all-round talent: ***innovative ideas, problem solving capabilities, technical know-how & artistic abilities***. The society actively promotes and recognizes upcoming talent, motivating students to excel in various domains.

We welcome...

Dr. Rajesh Saha, Assistant Professor

Dr. Rajesh Saha obtained his Ph.D. from NIT Silchar in 2018. He has joined our department as an Assistant Professor in November, 2023 and brings valuable expertise to our team. With prior roles at MNIT Jaipur and VIT AP University, Dr. Saha specializes in Modeling and Simulation of Nanoelectronics Devices.

Dr. Sucharita Chakraborty, Assistant Professor

Dr. Sucharita Chakraborty, holds a Ph.D. in communications from IIT Kharagpur. Her background includes positions as a Postdoctoral Researcher in Sweden and a scientist/engineer at ISRO Ahmedabad. Dr. Chakraborty's research interests encompass synchronization & estimation, resource allocation, cell-free massive MIMO, IRS, deep learning, and Integrated satellite and terrestrial communications.

Dr. Dipjyoti Das, Assistant Professor

Dr. Dipjyoti Das is a Ph.D. graduate from IIT Guwahati. His academic journey includes impactful roles as a post-doctoral researcher at KAIST, South Korea, and Georgia Institute of Technology, USA. Dr. Das is dedicated to pioneering advancements in electronics through ferroelectricity, with a particular focus on innovative devices such as NV-RAM, logic-compatible FEFET, and FE-NAND.

We bid farewell to Prof. Madhuchhanda Choudhury

Prof. Madhuchhanda Choudhury, joined NIT (then-REC) Silchar, on 10th February, 1984 as a Lecturer. In her illustrious career, spanning more than 40 years, she has contributed to the department and the institute in immense and inestimable manner.

Her vast experience in academics and domain expertise has been an asset to the department. Her honest and humble attitude at work place has been a example for us. As colleagues, it is our honour and privilege to work with her in various capacities.

Dear Prof. we wish you all the best for your post-retirement life !

The ECE family @ NIT Silchar

For comprehensive information about the department, including academic programs, research facilities, publications, ongoing projects, PhD, and PG programs, please visit our official website: http://ec.nits.ac.in/.
For any inquiries regarding the information shared in this newsletter, please contact us via email at: chandrajit@ece.nits.ac.in or dipjyoti@ece.nits.ac.in.

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