

RESEARCH PROFILE



Department of
Electrical and Electronics Engineering
BITS Pilani, Pilani Campus, Rajasthan



BITS Pilani
Pilani Campus



Department of Electrical and Electronics Engineering (EEE)

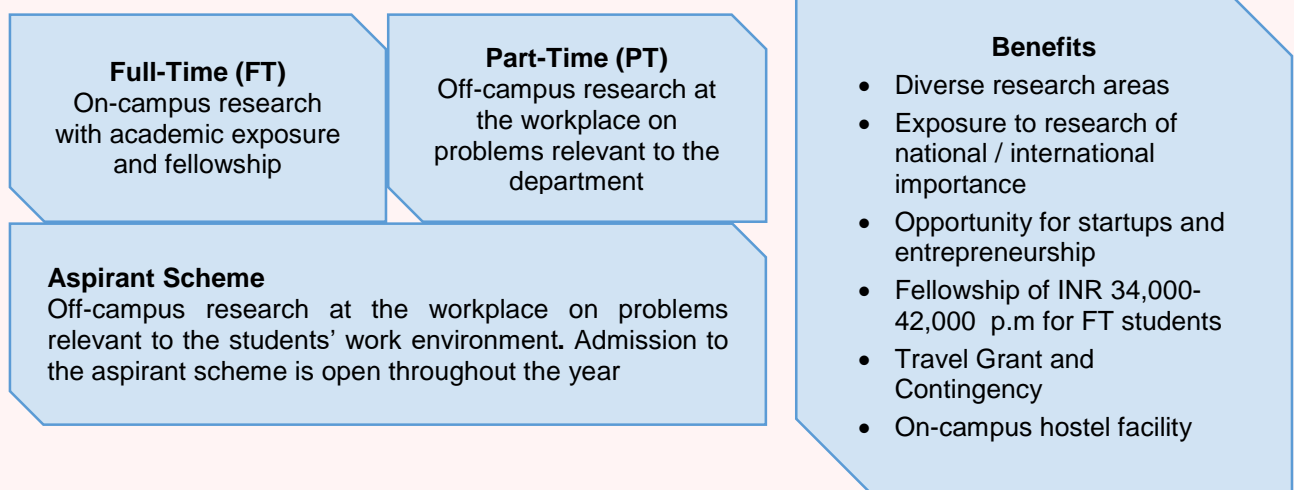
EEE Department was formed by merging the existing Electrical Engineering and Electronics Engineering departments in 1969-70 and the Instrumentation program was started in the year 1973. The department offers interdisciplinary courses and projects for providing cross-cutting knowledge to the students to pursue their interests. Our staff members typically have a high sense of purpose and derive great meaning from working together to ensure BITS Pilani's academic and research excellence is well supported.

Vision: To be at par with the best universities offering engineering education at the undergraduate and graduate level programmes in area of Electrical, Electronics, Communication and Instrumentation Engineering.

Mission: Provide quality education with emphasis on strong foundation, fostering creativity and use of modern ICT tools, strengthen research activities in thrust areas of the Department, Foster strong collaboration with industries, Support entrepreneurial activities for technology development.

Programs offered	BITS-Pilani, Pilani campus
UG (BE)	<ol style="list-style-type: none"> 1. Electrical and Electronics Engineering 2. Electronics and Instrumentation Engineering 3. Electronics & Communication Engineering
PG (ME)	<ol style="list-style-type: none"> 1. Communication Engineering 2. Embedded Systems 3. Microelectronics
PhD	Full-Time, Part-Time and Aspirant schemes

Ph.D. Programs and Benefits



Eligibility Criteria

Minimum academic record of 60 % marks or 6/10 CGPA in one of the following,

- Higher degree (M.E/ M.Tech.) in relevant area (both FT and PT schemes)
- First degree (BE/BTech in Electrical/Electronics Engg./M.Sc. in Electronics/ Electronics Science/Physics, (FT only).

Selection Criteria:

Shortlisted candidates will be called for written test/interview at Pilani Campus. Candidates with Higher Degree (M.E. / M.Tech.) as the highest qualification or those with National Fellowships like CSIR / DBT/UGC are exempted from the written test. Selected candidates with first degree (B.E/M.Sc) will undergo coursework for two semesters with minimum performance requirements.

Research Areas:



LAST DATE TO APPLY:







Deadline to receive filled applications with the prescribed application fee is
17:00 hrs. on **November 25th 2023**

To apply online, copy the below link and paste in your browser
<https://bitsat.cbexams.com/phd2023xsem2apply/OnlineReg.aspx>

RESEARCH ACTIVITIES OF FACULTY MEMBERS

(<https://www.bits-pilani.ac.in/pilani/ElectricalElectronicsInstrumentation/Faculty>)

Faculty Members	Major Thrust Areas of Research	Research Profile
 <p>Prof. Navneet Gupta (Professor and Head)</p>	<p>Modeling of Micro/Nano Electronic Devices, Flexible and Wearable Electronics, Flexible Antennas and Computational Material Science</p>	<p>Number of Ph. Ds produced = 8</p> <p>i 10 index = 37</p>
 <p>Prof. V. Ramgopal Rao (Senior Professor & Vice Chancellor)</p>	<p>Nanoelectronics, Micro/Nano-fabricated Sensor Systems, Technology Aware Design Challenges with Emerging Technologies, CMOS Reliability, Bio-MEMS</p>	<p>Number of Ph. Ds produced = 52</p> <p>i 10 index = 185</p>
 <p>Prof. V. K. Chaubey (Professor)</p>	<p>Optical Wave Guides and Integrated Optics, Wireless & Optical Communication</p>	<p>Number of Ph. Ds produced = 7</p> <p>i 10 index = 20</p>
 <p>Prof. Anu Gupta (Professor)</p>	<p>Analog and mixed signal integrated circuits, RF integrated circuits, VLSI digital circuits</p>	<p>Number of Ph. Ds produced = 3</p> <p>i 10 index = 19</p>

Faculty Members	Major Thrust Areas of Research	Research Profile
 Prof. Hari Om Bansal (Professor)	Electrical Power System, Voltage Stability Analysis, Control System A I Techniques	Number of Ph. Ds produced = 5 i 10 index = 24
 Prof. Hitesh Datt Mathur (Professor)	Electrical Power System Operation and Control, Demand Side Management, Renewable Energy Resources, AI/ML applications in Smart Grid Technologies.	Number of Ph. Ds produced = 3 i 10 index = 25
 Prof. Dheerendra Singh (Professor)	Supercapacitor/ Batteries Modelling, WBG based Power Devices & Power Quality, NanoBiosensor fabrication	Number of Ph. Ds produced = 3 i 10 index = 1
 Prof. Karunesh Kr Gupta (Professor)	Digital Signal Processing , Instrumentation	Number of Ph. Ds produced = 6 i 10 index = 19
 Prof. Abhijit Rameshwar Asati (Professor)	VLSI design, Micro/ Nano electronics, VLSI test, CAD for VLSI, Embedded system design, high level synthesis, Hardware development for image processing applications, Artificial intelligence and machine learning applications, Artificial intelligence and machine learning hardware design etc.	Number of Ph. Ds produced = 4 i 10 index = 11
 Prof. Rajneesh Kumar (Associate Professor)	Electronics and Control, Soft Switching Invertors	Number of Ph. Ds produced = 2 i 10 index = 13

Faculty Members	Major Thrust Areas of Research	Research Profile
 <p>Prof. Praveen Kumar A.V (Associate Professor)</p>	<p>Radiofrequency and Microwave engineering, Antennas and propagation, Computational Electromagnetics, RF based physical and material sensors</p>	<p>Number of Ph. Ds produced = 2</p> <p>i 10 index = 15</p>
 <p>Prof. Rahul Singhal (Associate Professor)</p>	<p>Optical Waveguides and Networks, Antenna and Wave Propagation, Frequency Selective Surfaces</p>	<p>Number of Ph. Ds produced = 1</p> <p>i 10 index = 5</p>
 <p>Prof. Sainath Bitragunta (Associate Professor)</p>	<p>Communication Systems, Modeling, Design, and analysis</p>	<p>Number of Ph. Ds produced = 1</p> <p>i 10 index = 5</p>
 <p>Prof. Arnab Hazra (Associate Professor)</p>	<p>Electronic Devices, Nanomaterials, Graphene, Chemical Sensor, Resistive RAM</p>	<p>Number of Ph. Ds produced = 2</p> <p>i 10 index = 36</p>
 <p>Prof. Pawan Kamalkishor Ajmera (Associate Professor)</p>	<p>Signal Processing, Biometrics</p>	<p>Number of Ph. Ds produced = 2</p> <p>i 10 index = 9</p>
 <p>Prof. Nitin Chaturvedi (Associate Professor)</p>	<p>VLSI Design, Computer Architecture</p>	<p>Number of Ph. Ds produced = 1</p> <p>i 10 index = 4</p>

Faculty Members	Major Thrust Areas of Research	Research Profile
 <p>Prof. Vinay Chamola (Associate Professor)</p>	<p>Internet of Things, Embedded system design, Drones, Vehicular Networks, Healthcare, Security</p>	<p>Number of Ph. Ds produced = 2</p> <p>i 10 index = 86</p>
 <p>Prof. Syed M Zafaruddin (Associate Professor)</p>	<p>AI/ML for 6G Wireless Networks, Quantum Communication, High Frequency (FSO & THz) Wireless Systems, Holographic MIMO, Reconfigurable Holographic Surface, Reconfigurable Intelligent Surface, Distributed Signal Processing</p>	<p>Number of Ph. Ds produced = 1</p> <p>i 10 index = 18</p>
 <p>Dr. Puneet Mishra (Assistant Professor)</p>	<p>Intelligent control, Fractional order control, Fuzzy systems, Effect of renewable energy penetration in power systems</p>	<p>Number of Ph. Ds produced = 1</p> <p>i 10 index = 7</p>
 <p>Dr. Sujan Yenuganti (Assistant Professor)</p>	<p>Instrumentation, Sensor development using smart materials, MEMS and Energy harvesting</p>	<p>Number of Ph. Ds produced = 1</p> <p>i 10 index = 2</p>
 <p>Dr. Bijoy Krishna Mukherjee (Assistant Professor)</p>	<p>Nonlinear Control, Flight Dynamics, Estimation, Power Systems Operation and Control</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = 10</p>
 <p>Dr. Meetha .V. Shenoy (Assistant Professor)</p>	<p>Embedded Systems, Robotics and Autonomous Systems, Networked Embedded Systems, Technologies for IoT, Swarm & Multi-robotic systems, VLSI Architectures</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = -</p>

Faculty Members	Major Thrust Areas of Research	Research Profile
 <p>Dr. Pankaj Arora (Assistant Professor)</p>	<p>Microelectronics and nanophotonics, optical sensors, Silicon photonics</p>	<p>Number of Ph. Ds produced = 1</p> <p>i 10 index = 5</p>
 <p>Dr. G Sai Sesa Chalapathi (Assistant Professor)</p>	<p>Edge Computing, Internet of Things, Unmanned Aerial Vehicles, Wireless Sensor Networks, IoT and Ai/ML in Precision Agriculture</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = 6</p>
 <p>Dr. Aditya R. Gautam (Assistant Professor)</p>	<p>Power electronics for renewable energy, Power quality, active power filters, solar PV integration, microgrids</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = 8</p>
 <p>Dr. Ashish Patel (Assistant Professor)</p>	<p>Renewable energy, microgrids, Power electronics for renewable energy</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = -</p>
 <p>Dr. Sandeep Joshi (Assistant Professor)</p>	<p>Device to Device Communications, B5G/6G Communications, AI in Wireless Communications, Molecular and Power Line Communications</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = 7</p>

Faculty Members	Major Thrust Areas of Research	Research Profile
 <p>Dr. Rahul Kumar (Assistant Professor)</p>	<p>Electronic devices, Semiconductor physics, Material characterization, Epitaxial growth of III-V and group IV semiconductors, Nanostructure growth, Dissimilar Epitaxy, Nanofabrication</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = 14</p>
 <p>Dr. Sharda Tripathi (Assistant Professor)</p>	<p>Communication networks, AI powered solutions for IoT communication and applications, Smart grid networks, Design, analysis and development of 5G networks and beyond</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = 4</p>
 <p>Dr. Satyendra Kumar Mourya (Assistant Professor)</p>	<p>Semiconductor materials and devices, VLSI technology, Solid state gas sensors, Optoelectronics, Nanoelectronics, Thin films fabrication using PVD, SiC based electron devices, Electrochromic devices</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = 11</p>
 <p>Dr. Dinesh Rano (Visiting Assistant Professor)</p>	<p>RF Microwave and Antenna Engineering, Polarization Stable Metasurface, Wireless Power Transfer, Biomedical Antennas, and Dielectric Characterization</p>	<p>Number of Ph. Ds produced = 0</p> <p>i 10 index = 7</p>



Dr. Upendra Mohan Bhatt
(Visiting Assistant Professor)

Microelectronics and VLSI, TCAD Modelling, 3D NAND Flash Memory, Semiconductor Memories for IoT Applications, , Emerging Flash Memory Technologies, Artificial Intelligence and Machine Learning for Semiconductor Memories

Number of Ph. Ds produced = 0

i 10 index = 3



Dr. Sukriti Garg
(Visiting Assistant Professor)

Optical Networks, Optical communication, Energy efficient networks

Number of Ph. Ds produced = 0

i 10 index = NA

Ph.D. thesis awarded in 2022-2023 (till October)

S.No	Name	ID	Topic	Supervisor	Co-Supervisor
1	Harshavardhan S.	2016PHXF203P	Computational model predictions of vowel level, age and hearing loss on concurrent vowel identification	Dr. Anantha Krishna Chintanpalli	-
2	Krishna Veer singh	2016PHXF005P	Energy Efficiency Improvement in Plug-in/Solar Hybrid Electric Vehicle using Ultra-capacitors	Prof. Hari Om Bansal	Dheerendra Singh
3	Teena Gakhar	2017PHXP0020P	Doping effects on TiO ₂ nanotube array based sensors for efficient detection of organic vapors	Dr. Arnab Hazra	
4	Jahagirdar Ankush Chandrakant	2016PHXF0202P	Condition Monitoring of Machines using Vibration and Acoustic Signal Processing Techniques	Dr. K. K. Gupta	-
5	Ankita Dixit	2017PHXF0414P	Investigations and Modeling of the Electronic Behavior of Carbon Nanotube Field-Effect Transistors (CNFETs)	Prof. Navneet Gupta	-
6.	Punit Khatri	2017PHXF0009P	Modeling and Estimation of Drinking Water Quality Index (WQI) based on Integrated Multi-Sensor Array	Dr. K. K. Gupta	Dr. R. K. Gupta
7.	Ritish Kumar	2016PHXF0007P	Design and Development of a Directional Ultra Wideband Slot Antenna	Dr. Praveen Kumar A.V	-
8.	Praveen Kumar Sharma	2016PHXF0502P	Design, Characterization and Analysis of Polydimethylsiloxane (PDMS) Based Flexible Antenna	Prof. Navneet Gupta	-

9.	Devesh Samaiya	2016PHXF0204P	On Foreground Extraction and Semantic Encoding of Visual Information in HEVC Compressed Domain	Dr. K K Gupta	-
10.	Jagdish Chandra Joshi	2013PHXF0506P	Design and Development of a Biometric Access Control System using Facial Images	Prof. K. K. Gupta	-
11	Srinath K	2013PHXF0105P	Development of Intelligent Pattern Recognition Algorithms for Assessment of Quality of Edible Oils	Prof. Surekha Bhanot	Dr. Panchariya
12	Gorla Praveen	2019PHXF0028P	Resource Provisioning and Management of Smart and Sustainable 5G Small Cells Base Stations	Dr. Vinay Chamola	-
13	Ziyaar Rahman	2017PHXF0416P	Optical Wireless Communication over Fog-Induced Fading: Performance Analysis and Mitigation Techniques	Dr. S. M. Zafaruddin	Prof. V. K. Chaubey
14	Himanshu Purohit	2015PHXF0502P	Person Authentication based on Multimodal Biometric Systems	Dr. Pawan Ajmera	-
15	Sambhavi shukla	2018PHXF0426P	Plasmonic nanostructure based optical sensor for refractive index and thickness sensing	Dr. Pankaj Arora	-
16	Poonam Poonia	2017PHXF0016P	Person authentication based on palm-print recognition	Dr. Pawan Ajmera	-
17	Sankalp paliwal	2018PHXP0434P	Design fabrication and control of a pressure sensor	Dr. Sujan Yenuganti	-
18	Akhilesh Kumar Mishra	2017PHXP0426P	Studies on intelligent controllers for dynamical plants with nonlinear actuators	Dr. Puneet Mishra	Prof. Hitesh Datt Mathur

Ph.D. Thesis Submitted during the year (Ph.D defense awaited)

S.No	Name	ID	Topic	Supervisor	Co-Supervisor
1	Abheek Gupta	2016PHXF0423P	Digital Hardware Implementation for Smart Portable Device for Water Quality Indexing using ANN-based Data Augmentation	Prof. Anu Gupta	Prof. Rajeev Gupta
2	Ashish Kumar Verma	2018PHXF0017P	Investigations on Frequency Selective Reflectors Towards Gain Enhancement of Wideband Planar Compact Antennas	Prof. Rahul Singhal	-
3	Radha Bhardwaj	2019PHXP0031P	Development of functionalised 2D nanomaterial based FET sensors system for breath analysis applications	Prof. Arnab Hazra	-

SPONSORED RESEARCH AND CONSULTANCY

1. Extra Mural Research (EMR)/ Core Research Grant (CRG) received from different agencies during the last five years:

i) Ongoing Projects: Total Amount (₹) **65951138** and No. of Research Projects: **25**

S No	Name of the Investigator	Funding Agency	Title of the project	Amount sanctioned
1	Dr. Hitesh Datt Mathur	DST	IoT based energy management system of a Microgrid with V2G (Vehicle to Grid) feature	4753100
2	Dr. Hitesh Datt Mathur	MHRD	Management of Distributed energy resources in smart cities: Challenges and Advanced control strategies	4255900
3	Dr. Arnab Hazra	DBT	Development of 1-D Nanomaterials based Selective Sensor System for Non-Invasive Detection of Diabetes Mellitus and Asthma by Breath Analysis Technique	4657120
4	Dr. Arnab Hazra	MHRD	Carbon nanomaterials for chemical sensing applications	4611610
5	Dr. K K Gupta	DST	Development of a cyber-physical system based smart water grid for community usage	2754200
6	Dr. K K Gupta	DST	Structural Health Assessment and Rehabilitation Framework based on Cyber physical System	1172600
7	Dr. Meetha V. Shenoy	DST	Design and Development of Soft robotic system for selective harvesting of coffee cherries	3977600
8	Dr. Vinay Chamola	SHASTRI INDO CANADIAN INSTITUTE	Artificial Intelligence Enabled security provisioning and vehicular vision innovations for autonomous vehicles	1000000
9	Dr. Nitin Chaturvedi	DST	A Dual Mode Hybrid In-Memory Computing array for high performance applications using conventional CMOS technology and emerging ferromagnetic technology	2982800
10	Dr. Puneet Mishra	DBT	Development of a real time crop advisory system exploiting nanotechnology based nitrogen sensor with internet of farming (IoF) framework	4615240
11	Dr. Vinay Chamola	DST	Artificial Intelligence and Blockchain Enabled Secure and Scalable Framework for Online Healthcare Applications	3269396
12	Dr. Sandeep Joshi	HUGHES SYSTIQUE (P) LTD	Rendering Software Consultancy Services for 5G Cellular OTA Scanner to Hughes' office in Gurgaon	1203675
13	Dr. Arnab Hazra	SERB	Multiple Nano-filaments Based Resistive Switching Memories on Flexible Substrate: Implemented by Self-assembled doped metal oxides/perovskites	3821400
14	Dr. Sandeep Joshi	SERB	Intelligent Reflecting Surface (IRS) Assisted 5G and Beyond Communications: Modeling, Design, and Analysis	3084400
15	Dr. SYED MOHAMMAD ZAFARUDDIN	SERB	Analytical modeling of Integrated sensing and communication for cellular IoT and In-Vivo Nano networks	660000
16	Jyoti Pandey	DST	Convolutional neural networks and their hardware implementation for improved performance	2181825
17	Dr. Sai Sesha Chalapathi Gattupalli	TIH-IOT, IIT Bombay	LoRa-WSN-based IoT Communication Platform for Precision Agriculture	2528900

S No	Name of the Investigator	Funding Agency	Title of the project	Amount sanctioned
18	Dr. Pawan K Ajmera	IITI DRISHTI CPS Foundation NM ICPS	Hyper spectral Image analysis and Machine learning for germ detection and precision agricultural	990000
19	Dr. Vinay Chamola	DRIFE Technologies Pvt Ltd	"Design and development of Blockchain-based schemes for Roadside Unit (RSU) and Vehicular communication	2571800
20	Dr. Sainath Bitragunta	Ministry of Electronics & Information Technology	Quantum Algorithms for Efficient Wireless Energy Transfer in Renewable Sensor Networks.	335792
21	Dr. Sai Sessa Chalapathi Gattupalli	TIH-IOT, IIT Bombay	Computational learning through context adaptation for effective and Efficient Agriculture	248875
22	Dr. Hari Om Bansal	CPRI	Photovoltaic Fed Microgrids: Integrated Intelligent Harmonic Control to Enable Electric Vehicle Charging	2055185
23	Dr. Rajneesh Kumar	CDAC Thiruvananthapuram R&D Organization of the Ministry of Electronics and Information Technology (MeitY), Government of India	Design and development of a multi output high voltage gain converter with multi- frequency operation for PV applications and green hydrogen generation	3341800
24	Dr. Vinay Chamola	IIT Bombay TIH Foundation for IoT and IoE	Artificial Intelligence Assisted Blockchain Enabled and Aadhaar Linked Electronic Medical Record Management and Tele-Consultation System	2320360
25	Dr. Meetha V. Shenoy	IIT Bombay TIH Foundation for IoT and IoE	Design & Development of a Federated Learning-based Smart Object Detection Accelerator for Autonomous Vision in IoT-enabled Systems	2557560

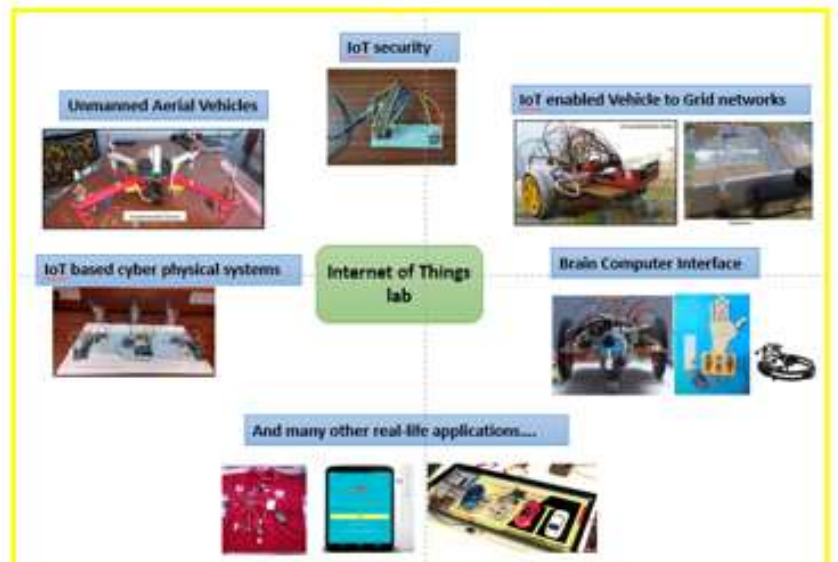
ii) Completed Projects (in last 5 Years): Total Amount (₹) **22075050** and No. of Research Projects: **12**

S No	Name of the Investigator	Funding Agency	Title of the project	Amount sanctioned
1	Dr. Praveen Kumar AV	SERB	Development of a Dielectric Resonator based displacement sensor	2074860
2	Dr. Anu Gupta	ICSSER	Crime Analysis and study for safe cities with emphasis on women safety using technology and societal participation	525000
3	Dr. H D Mathur	CPRI	Development of Improved Design and Control Techniques for Unified Power Quality Conditioner with Distributed Generation (UPQC-DG)	2109000
4	Dr. Vinay Chamola	DST	Resource dimensioning and management of smart and sustainable 5G small cells for rural broadband	2833770
5	Dr. Hari Om Bansal	ICSSR	Modelling of Drivers and Barriers of electric vehicle penetration in emerging economy : A study of Indian Market	525000
6	Dr. Navneet Gupta	DST	Design and Analysis of Metamaterial Based Antenna for Wearable Application	1182350
7	Dr. Rahul Singhal	DRDO	GaN Gratings-on-Diaphragm based Optical Pressure Sensing in Harsh Environments	966000
8	Dr. Syed Zafaruddin	SERB	Machine learning techniques for resource allocation in cell-free massive MIMO communications	1848400
9	Dr. Navneet Gupta	DRDO	Study on Electronic Transport Behaviour of Carbon nanotube based field effect transistors (CNTFETs)	2182000
10	Dr. K.K.Gupta	DST	Soft Computing framework based Integrated Multi Sensor Array for Water Quality Assessment: Targeting fluoride as major parameter	3870000

S No	Name of the Investigator	Funding Agency	Title of the project	Amount sanctioned
11	Dr. Arnab Hazra	DST	Development of Tio2 nanotube based highly selective capacitive type sensor device for the detection of methanol poisoning in alcoholic beverage	2776320

TEACHING/RESEARCH LABORATORIES

S.No	Name of Laboratory	Type of Lab
1	Microelectronics/ VLSI Design Lab (O-Lab)	Teaching and Research
2	Embedded Controller Application Centre	Teaching and Research
3	Virtual Instrumentation Lab	Teaching
4	Instrumentation Technology Lab	Teaching
5	Power Electronics Lab	Teaching and Research
6	Electrical Machines Lab	Teaching
7	Optical and Wireless Communication Lab	Teaching and Research
8	Communication Engineering Lab	Teaching and Research
9	Analog & Digital Electronics Lab	Teaching
10	Nanoelectronics and Device Lab	Teaching and Research
11	IoT and Sensor Lab	Teaching and Research
12	Flexible Electronics Lab	Teaching and Research

VLSI Lab (O-Lab)**Power Electronics Lab****Sensor/Device Lab****Electrical Machine Lab****Virtual Instrumentation Lab****JOURNAL PUBLICATIONS (in last 5 Years)**

- 1) Balaji, A., U. Tripathi, V. Chamola, A. Benslimane and M. Guizani (2023). Toward Safer Vehicular Transit: Implementing Deep Learning on Single Channel EEG Systems for Microsleep Detection. *IEEE Transactions on Intelligent Transportation Systems* 24(1): 1052-1061.
- 2) Borah, S. K., S. Anand, R. V. Agarwal and S. Bitragunta (2023). Analysis of Adversarial Jamming From a Quantum Game Theoretic Perspective. *IEEE Systems Journal* 17(1): 881-891.
- 3) Chowdhury, R., B. K. Mukherjee, P. Mishra and H. D. Mathur (2023). Performance assessment of a distribution system by simultaneous optimal positioning of electric vehicle charging stations and distributed generators. *Electric Power Systems Research* 214.
- 4) de Souza, A. B., P. A. L. Rego, V. Chamola, T. Carneiro, P. H. G. Rocha and J. N. de Souza (2023). A Bee Colony-Based Algorithm for Task Offloading in Vehicular Edge Computing. *IEEE Systems Journal*: 1-12.
- 5) Gorla, P., M. Saif, V. Chamola, B. Sikdar and M. Guizani (2023). Decentralized Renewable Resource Redistribution and Optimization for Beyond 5G Small Cell Base Stations: A Machine Learning Approach. *IEEE Systems Journal* 17(1): 988-999.
- 6) Goyal, A., M. Mandal, V. Hassija, M. Aloqaily and V. Chamola (2023). Captionomaly: A Deep Learning Toolbox for Anomaly Captioning in Social Surveillance Systems. *IEEE Transactions on Computational Social Systems*: 1-9.
- 7) Kohli, V., S. Chakravarty, V. Chamola, K. S. Sangwan and S. Zeadally (2023). An analysis of energy consumption and carbon footprints of cryptocurrencies and possible solutions. *Digital Communications and Networks* 9(1): 79-89.

- 8) Nallusamy, N., R. Singhal, S. K. Sharma and D. S. Rawal (2023). High-Electron-Mobility Transistor-Inspired Freestanding AlGaIn/GaN/AlN Optical Waveguide for High-Pressure Sensing Applications. *Physica Status Solidi (A) Applications and Materials Science* 220(7).
- 9) Malik, G., S. K. Mourya, A. Garg, Priyanka and R. Chandra (2023). Sputter-Deposited Nano-porous ZnO Electrode for Highly Efficient Optoelectronic and Solid-State Energy Storage Devices. *Journal of Electronic Materials*.
- 10) Mishra, A. K., P. Mishra and H. D. Mathur (2023). A deep learning assisted adaptive nonlinear deloading strategy for wind turbine generator integrated with an interconnected power system for enhanced load frequency control. *Electric Power Systems Research* 214.
- 11) Pal, R. K., S. P. Dash, S. Joshi and D. Ghose (2023). Channel Estimation and Performance Analysis of a Wide-FOV Visible Light Communication System With Random Receiver Orientation and Location. *IEEE Transactions on Wireless Communications* 22(3): 1964-1979.
- 12) Pandiyan, P., Y. Sujan and S. S. Raju (2023). Design and simulation of piezoelectric MEMS logic gates. *Ferroelectrics* 602(1): 105-120.
- 13) Purohit, H., M. Dadhich and P. K. Ajmera (2023). Analytical study on users' awareness and acceptability towards adoption of multimodal biometrics (MMB) mechanism in online transactions: a two-stage SEM-ANN approach. *Multimedia Tools and Applications* 82(9): 14239-14263.
- 14) Rahman, Z., S. M. Zafaruddin and V. K. Chaubey (2023). Direct Air-to-Underwater Optical Wireless Communication: Statistical Characterization and Outage Performance. *IEEE Transactions on Vehicular Technology* 72(2): 2655-2660.
- 15) Rohmetra, H., N. Raghunath, P. Narang, V. Chamola, M. Guizani and N. R. Lakkaniga (2023). AI-enabled remote monitoring of vital signs for COVID-19: methods, prospects and challenges. *Computing* 105(4): 783-809.
- 16) Sai, S., V. Chamola, K. K. R. Choo, B. Sikdar and J. J. P. C. Rodrigues (2023). Confluence of Blockchain and Artificial Intelligence Technologies for Secure and Scalable Healthcare Solutions: A Review. *IEEE Internet of Things Journal* 10(7): 5873-5897.
- 17) Shukla, S., N. Grover and P. Arora (2023). Resolution enhancement using a multi-layered aluminum-based plasmonic device for chikungunya virus detection. *Optical and Quantum Electronics* 55(3).
- 18) Singh, A. K., N. K. Chowdhury, A. Hazra and B. Bhowmik (2023). Room-Temperature Au/TiO₂Nanorods/Ti TFT Butanone Sensor: Role of Surface States. *Journal of Electronic Materials*.
- 19) Singh, D. B. R. and R. S. M. Malar (2023). Improved Clamped Diode Based Z-Source Network for Three Phase Induction Motor. *Intelligent Automation and Soft Computing* 36(1): 683-702.
- 20) Sumitra and M. V. Shenoy (2023). HFedDI: A novel privacy preserving horizontal federated learning based scheme for IoT device identification. *Journal of Network and Computer Applications* 214.
- 21) Tripathi, S., C. Puligheddu, S. Pramanik, A. Garcia-Saavedra and C. F. Chiasserini (2023). Fair and Scalable Orchestration of Network and Compute Resources for Virtual Edge Services. *IEEE Transactions on Mobile Computing*: 1-17.
- 22) Vangala, A., A. K. Das, V. Chamola, V. Korotaev and J. J. P. C. Rodrigues (2023). Security in IoT-enabled smart agriculture: architecture, security solutions and challenges. *Cluster Computing* 26(2): 879-902.
- 23) Agrawal, H. P., H. O. Bansal, R. Kumar and Y. S. Sisodia (2022). Design and real-time validation of PI and Fuzzy Logic tuned photovoltaic integrated DSTATCOM to improve power quality. *Environmental Science and Pollution Research* 29(60): 90158-90177.
- 24) Agrawal, K., T. Alladi, A. Agrawal, V. Chamola and A. Benslimane (2022). NovelADS: A Novel Anomaly Detection System for Intra-Vehicular Networks. *IEEE Transactions on Intelligent Transportation Systems* 23(11): 22596-22606.
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For Further Information, Contact

Prof. Navneet Gupta

Head of Department, Department of Electrical & Electronics Engineering
Birla Institute of Technology and Science (BITS)
Pilani - 333031 (Rajasthan) India

Room Number : 2210-G

HoD Chamber : +91-1596-25-5280

Direct Phone: +91-1596-25-5611

Department Office: +91-1596-25-5233

E-mail: hod.eee@pilani.bits-pilani.ac.in

EEE Department Office Staff

Mr. Sanjay Bhargava and Mr. Yogesh Alaria
Department of Electrical & Electronics Engineering/Instrumentation

Room Number : 2210-E/F

Department Office: +91-1596-25-5233

E-mail: sanjay.bhargava@pilani.bits-pilani.ac.in and yogeshb@pilani.bits-pilani.ac.in

RESEARCH PROFILE

Department of
Electrical and Electronics Engineering

Birla Institute of Technology & Science, Pilani

Vidya Vihar Pilani, 333031, Rajasthan, India

 www.bits-pilani.ac.in

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