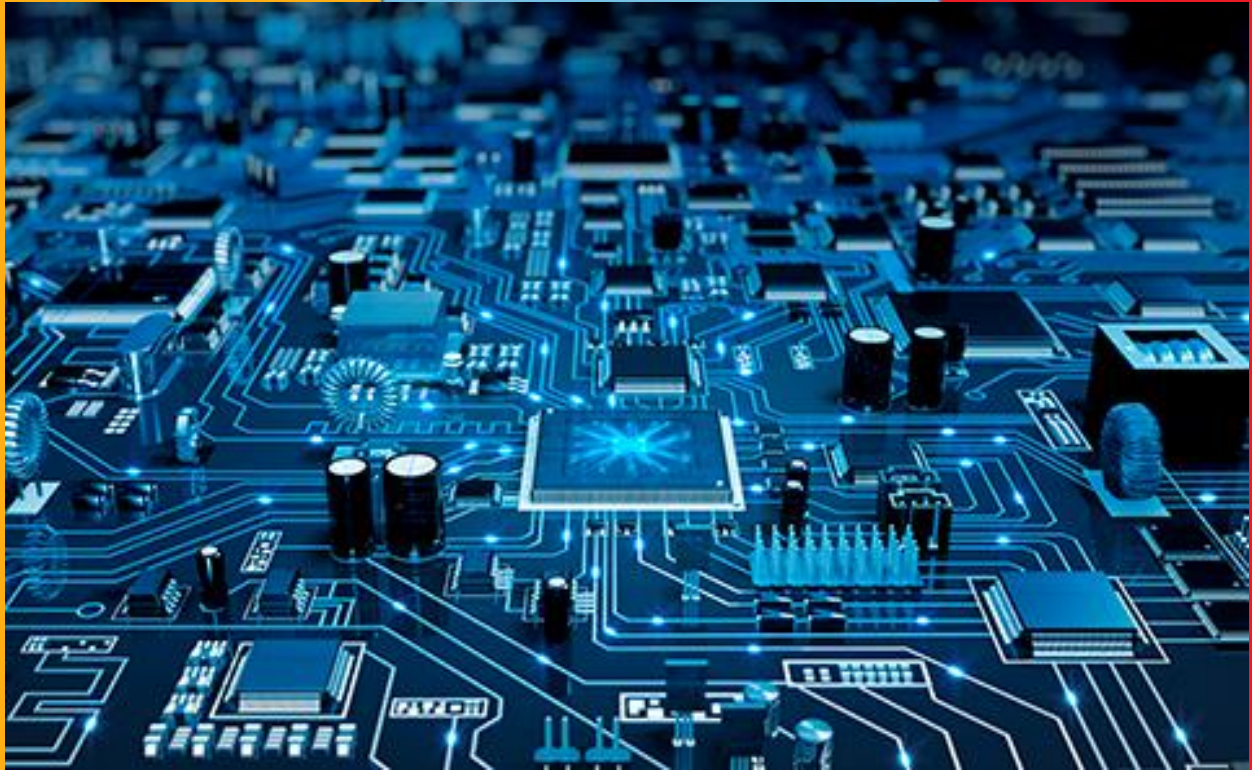# BITS Pilani

Hyderabad Campus

Department of EE, EC, EI
PLACEMENT BROCHURE

BITS Pilani, Hyderabad Campus

2019-20

➢ **Message from Head of the Department**

"Electrical & Electronics Engineering Department of BITS-Pilani, Hyderabad Campus offers broad based and up to date curriculum, with an optimum balance of theoretical and practical aspects of knowledge gained. Students are imparted coaching in core areas of Electrical & Electronics Engineering, allowed to work on study oriented, Lab oriented and Design projects with total relevance to the course content they are exposed to in order to make them ready for the industry and also enable them to be entrepreneurs. Department feels pride that an ample number of our graduating students are placed well"

➢ **About the Department**

To keep pace with the rapidly evolving electronics industry requires unwavering passion and urge to innovate. This, precisely, is what the Department of Electrical & Electronics Engineering at the BITS Pilani, Hyderabad Campus is about. The Department of Electrical & Electronics Engineering, which includes EEE, ECE and EIE for B.E, Microelectronics and Communication for M.E and Ph.D is one of the largest departments on the campus, comprising of students, faculty and technical staff. The broad spectrum of courses is taught by a group of highly-experienced faculty who are also researchers in their own areas. The syllabus - rigorous in design and content is in keeping with the latest developments in the industry. Well-equipped laboratories coupled with extensive practical work ensure the student receives a well-rounded education.

Students are actively involved in research and projects in thrust areas such as VLSI, Embedded Systems, Power Electronics, Communication Systems, etc., they are also encouraged to foray into interdisciplinary courses such as Image Processing, Medical Imaging, Renewable Energy, Pattern Recognition, etc., under the able guidance of the faculty. Strengthening University-Industry ties has always been one of the top priorities of the BITS curriculum. Keeping this in mind, the department has focused on industry-defined problems for thesis work. Numerous collaborations and MoUs signed with various organizations are testament to this commitment.

➢ **Programs Offered by the Department**

✓ B.E. (Hons.) Electronics and Communication Engineering
✓ B.E. (Hons.) Electrical and Electronics Engineering
✓ B.E. (Hons.) Electronics and Instrumentation Engineering
✓ M.E. Microelectronics
✓ M.E. Communication Engineering

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➢ **Important Core Courses and electives for B.E. (Hons.)**

ECE	EEE	EIE
Analog and Digital Communication	Electrical Machines	Electronics Instruments & Instrumentation
Digital Signal Processing	Power Electronics	Transducers & Measurement systems
Analog & Digital VLSI Design	Power Systems	Analog & Digital VLSI Design
EM Fields and Transmission Lines	Analog & Digital VLSI Design	Analog Electronics
Information Theory and Coding	Analog Electronics	Control Systems
Antenna Design Engineering	Neural Networks and Fuzzy logic	Industrial Instrumentation & control
Microwave Engineering	Engineering Optimization	Design of Instrumentation systems
Communication Networks	Control Systems	Computer Architecture
Computer Architecture and Organization	Modern Control Systems	Process Control
Analog Electronics	Communication Systems	Advanced Process Control
Cellular and Mobile Communication	Computer Architecture	Digital Image Processing
Digital Image Processing	Electromagnetic Theory	Communication Systems
Optical Communication	Power System Analysis and control	Digital Control
Satellite Communication	Power Apparatus & Networks	Virtual Instrumentation
Hardware Software Co-design	Digital Signal Processing	Instrumentation for Petro-Chemical Industry

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Important courses for M.E. (Hons.)

Microelectronics	**Communication Engineering**
✓ VLSI Design	✓ Advanced Digital Signal Processing
✓ VLSI Architecture	✓ RF and Microwave Engineering
✓ CAD IC Design	✓ Coding Theory and Practice
✓ Analog IC Design	✓ VLSI Design
✓ Physics and modeling of Microelectonic devices	✓ Mobile and Personal Communication
✓ Advanced VLSI Design	✓ Advanced Digital Communication
✓ IC Fabrication Technology	✓ Optical Communication

Electives offered

✓ Embedded system design

✓ Reconfigurable computing

✓ Research Practice

✓ Study in advanced topics

✓ Research Project

✓ Introduction to Artificial Neural Networks

✓ Hardware and software co-design

✓ Network Programming

✓ Estimation Theory

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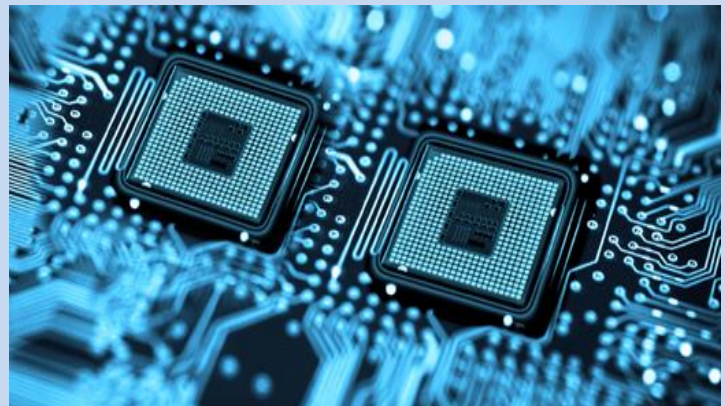
➤ **Facilities in Department**

The department has various labs aimed at providing practical knowledge to the students in different areas of electrical engineering. State of the art machinery, numerous experimental set ups and workstations installed with advanced simulation software are some of the highlights here. The labs are established with best interest of the students in mind. The lab courses are introduced at appropriate stages of the engineering programmes enabling the thought process needed for the making of a good electrical engineering graduate. The students gain practical knowledge which shall serve as a background for the complete understanding of their core subjects and somehow prepare them in a way so that they can face the industry world once they graduate. The labs are handled by the respective faculty in charge of the course and managed by a particular faculty as regards for periodic maintenance and improving the infrastructure from time to time.
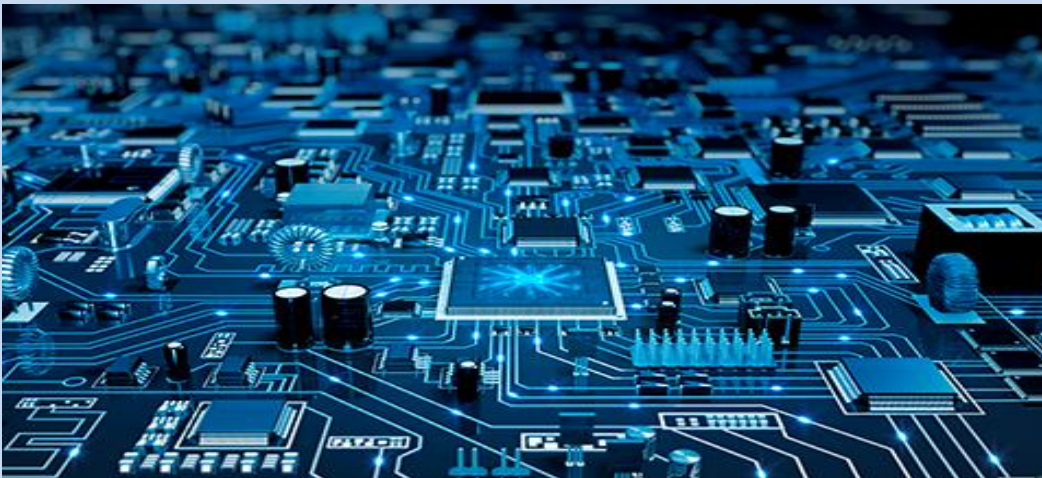
Highly qualified technicians and teaching assistants of the department help the faculty in charge for conducting the lab and student evaluation. In addition to the basic academic labs, a few research labs and centres are also established in the department. The research labs houses advanced equipment for carrying out projects by the PhD scholars and higher degree students of the department under the supervision of the respective principal investigator from the department faculty. Research labs are also provided with licensed servers of sophisticated simulation software using which funded research projects as well as student course projects are carried out.
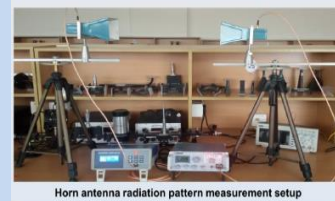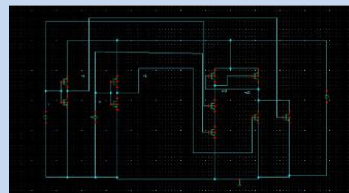
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➢ **Academic and Research Laboratories**

✓ Power Systems Laboratory

✓ Microelectronic Circuits Laboratory

✓ Power Electronics Laboratory

✓ Microprocessors and Interfacing Laboratory

✓ Digital Signal Processing Laboratory

✓ Communication Systems Laboratory

✓ Signals and Systems Laboratory

✓ Control Systems Laboratory

✓ Electrical Machines Laboratory

✓ MEMS/Microfluidics Laboratory

✓ Embedded Systems Laboratory

✓ Instrumentation Laboratory

✓ Optical Communications Laboratory

✓ Analog Electronics Laboratory

✓ FPGA Computing Laboratory

✓ Mobile and Personal Communication Laboratory

✓ Microwave and Antenna Design Laboratory

✓ VLSI CAD Laboratory

8086 KIT

X-band Microwave Test Bench

NI USRP Software defined radio platform interfaced with LabVIEW

Horn antenna radiation pattern measurement setup

> ➢ **Thrust Areas of Research:**

M. B. Srinivas	VLSI Arithmetic, Mixed Signal Design, Low power Design, Renewable Energy, Wireless Sensor Networks, Biomedical instrumentation, Tele- medicine, Reversible Computing, Signal Processing
BVVSN Prabhakar Rao	Biomedical Signal Processing and Modelling of Organic materials for solar cells
Sanket Goel	Microfluidics, MEMS, Lab-on-a-chip, Nanomaterials, Nanofabrication, Medical Diagnostics, Point-of-Care devices, 3D printing, Fuel Cells (Biofuel Cells), Hydrogen, Solar, Smart grids, Decentralized and Distributed Generation.
Subhendu Kumar Sahoo	VLSI architecture for Digital Signal Processing
Alivelu Manga Parimi	Power Systems: FACTS, Power system stability, Power Quality
Prasant Kumar Pattnaik	Photonics, Optical Communications, Photonic Integrated Circuits, MEMS
Venkateswaran Rajgopalan	Human brain mapping using Magnetic Resonance Imaging (MRI), Transcranial Magnetic Stimulation(TMS), Electroencephalography (EEG), Positron Emission Tomography (PET), Biomedical signal processing (EMG, EEG, Motor Evoked Potential(MEP)), Biomedical Image processing (MRI functional MRI, diffusion MRI), Machine Learning, Graph Theory (brain network analysis).
Runa Kumari	Dielectric Resonator Antenna, Log periodic Antenna, Reconfigurable Antenna, Microstrip antenna, Antenna Array.
Sumit Kumar Chatterjee	Digital VLSI Design, Video Compression
Souvik Kundu	Nanoelectronics; Semiconductor Physics and Devices; Thin Films; Materials for Electronics; Design & Fabrication of Nano/Micro-Electronic Devices, etc.
Soumya J	Network-on-Chip (NoC) design Application-Specific Synthesis of NoC Reconfigurable NoC design.
Surya Shankar Dan	Device physics of `beyond CMOS´ state-of-the-art device technologies and simulation Physics based nanoscale electronic device compact modeling for state-of-the-art VLSI IC designs Methodology / algorithms for characterization and numerical simulation of electronic devices
Shaikshavali Chitraganti	Modeling, identification, control of Networked control systems, Switching systems, Statistical signal processing.
Syed Ershad Ahmed	VLSI Arithmetic Circuits, Low Power VLSI Design
Chetan Kumar	Computer Arithmetic, CNFET based Multi-valued logic design, Reversible Arithmetic circuits

➢ **Sponsored projects**

S.No	Name	Designation	PI / Co-PI	Funding Agency	Duration	Amount
1	Harish V. Dixit	Asst. Prof.	PI	DRDO	6 months	4.17 lakhs
2	Runa Kumari	Asst. Prof.	Co-PI	DRDO	6 months	4.17 lakhs
3	Sanket Goel	Associate Professor	PI	DST	3 years	42 lakhs
4	Soumya J	Assistant Professor	PI	DST	2 years	8.89 lakhs

➢ **Student Projects (B.E.)**

➢ Reconfigurable antenna
➢ High Speed Adder
➢ Cu:ZnO Based photodetectors
➢ Low Power adder Circuits
➢ Design and Synthesis of Ternary Logic Circuits using CNFETs

➢ conformal antenna
➢ DCT based compression
➢ Memristor logic (with Technion)
➢ Efficient logarithmic converter
➢ Design of Efficient Arithmetic Circuits

➢ Dielectric Resonator Antenna
➢ CORDIC architecture
➢ Memristor neural network (with IISc)
➢ Low Power multiplier Circuits
➢ Design and Synthesis of Reversible Circuits

➢ **Student Projects (M.E.)**

✓ Metasurface
✓ Motion estiamtion
✓ Implementation of arithmetic units on DSP applications
✓ Smart Health monitoring system
✓ Design of Ternary and Quaternary circuits

✓ Antipodal Vivaldi Antenna
✓ SAD computer
✓ Implementation of mutiplier on DSP applications
✓ Intelligent gas leak detection panel
✓ Design of Co-processor for RISC-V based Rocket Chip processor

✓ Biomedical Antenna
✓ low power design
✓ GOTFET device based Digital and Analog Circuits
✓ Network-on-Chip Router Architecture Implementation
✓ Design of Approximate circuits for Image processing Applications

➤ Journal Publications

#	Authors	Title of the Publications	Details of the Journal	Year
Year 2019				
1	**Puneeth S B and Sanket Goel,**	Amperometric Automation and Optimization Paper Microfluidic Viscometer	Accepted for publication with IEEE Sensors Letters, 2019.	2019
2	**RK Tripathy**, A Bhataacharyya, RB Pachori	A Novel Approach for Detection of Myocardial Infarction from ECG signals of Multiple Electrodes	Accepted for publication with IEEE Sensors Journal, 2019.	2019
3	**P. Veda Bhanu, Pranav Venkatesh Kulkarni, Soumya J**	Butterfly-Fat-Tree Topology based Fault-Tolerant Network-on-Chip Design using Particle Swarm Optimization	Accepted for publication in Journal of Experimental & Theoretical Artificial Intelligence	2019
4	**P. Veda Bhanu, Pranav Venkatesh Kulkarni, U. Anil Kumar, J. Soumya**	Butterfly-Fat-Tree Topology-Based Fault-Tolerant Network-on-Chip Design Using Particle Swarm Optimization	Book title: Harmony Search and Nature Inspired Optimization Algorithms Book Series: Advances in Intelligent and Soft Computing, Volume: 741 Publisher: Springer Nature Singapore Pte Ltd. Book ISBN: 978-981-13-0760-7 Book ID: 461655_1_En Chapter 108	2019
5	Monil Shah, Mohit upadhyay, **P. Veda Bhanu, J. Soumya**, Linga Reddy Cenkeramaddi	A Novel Fault-Tolerant Routing Algorithm for Mesh-of-Tree Based Network-on-Chips	Book title: VLSI Design and Test Book Series: Communications in Computer and Information Science, Volume: 892 Publisher: Springer Nature Singapore Pte Ltd. Book ISBN: 978-981-13-5949-1 Book ID: 479122_1_En Chapter 38	2019
6	**RK Tripathy**, Mario R. A. Paternina, Juan G. Arrieta, Alejandro Zamora-M endez, and Ganesh R. Naik	Automated Detection of Congestive Heart Failure from Electrocardiogram Signal using Stockwell Transform and Hybrid Classification Scheme	Computer Methods and Programs in Biomedicine , Elsevier, 2019	2019
7	Viswabhargav Ch.S.S.S, **RK Tripathy**, U R Acharya	Automated Detection of Sleep Apnea using Sparse Residual Entropy Features with Various Dictionaries extracted From Heart rate and EDR signals	Computers in Biology and Medicine	2019

8	Haroon Khan, Chul Min Kim, Sung Yeol Kim, Sanket Goel, Prabhat K. Dwivedi, Ashutosh Sharma, Young Ho Kim, Gyuman Kim	Fabrication of an Enzymatic Biofuel Cell with Electrodes on Both Sides of a Microfluidic Channel	International Journal of Precision Engineering and Manufacturing-Green Technology (Springer)	2019
9	Madhavi Bandapati, Balaji Krishnamurthy and **Sanket Goel**	Fully assembled Membraneless Glucose Biofuel Cell with MWCNT/ Enzyme Modified Pencil Graphite leads as Novel Bioelectrodes	IEEE Transactions for Nanobioscience	2019
10	Chaitali Mankar, Prakash Rewatkar, Mayuri Dhone, Suresh Balpande, Jayu Kalambe, Rajesh Pande, Sanket Goel	Paper based Microfluidic Microbial Fuel Cell to Harvest Energy from Urine	Sensors Letters	2019
11	Puneeth S B and Sanket Goel,	3D Printed Microfluidic Paper-based Analytical Device with Integrated Screen-printed Electrodes for Automated Viscosity Measurements	IEEE Transactions on Electron Devices (accepted)	2019
12	Sandeep Kumar, and Runa Kumari	Composite Right/Left-Handed Wideband Metamaterial Antenna Loaded with SRRs and CSRRs to Improve Gain and Efficiency	IET Microwave, Antennas and Propagation,	2019
13	Runa Kumari and Santanu Kumar Behera	Capacitive coupled Frequency Independent Dielectric Resonator Antenna Array for X-band Applications	IETE Journal of Research (TIJR), Taylor & Francis	2019
14	Swapna Challagundla, Shaikshavali Chitraganti, Samir Aberkane	Event-based state estimation under the presence of multiplicative measurement noise	IEEE Control System Letters (accepted)	2019
Year 2018				
1	M. T. L. Gayatri, Alivelu M. Parimi	A Review of Reactive Power Compensation Techniques in Microgrids	Renewable & Sustainable Energy Reviews, Elsevier, Volume 81	2018
2	Ramakant, Sanjay Vidhyadharan, Gangishetty Akhilesh, Vaibhav Gupta, Anand Ravi and Surya Shankar Dan	Part I: Optimization of the Tunnel FET Device Structure for Achieving Circuit Performance Better Than the Current Standard 45 nm CMOS Technology	Book title: The Physics of Semiconductor Devices Publisher: Springer Nature Switzerland AG 2018 Book ISBN: 978-3-319-97603-7 Book ID: 454074_1_En Chapter 96	2018
3	Sanjay Vidhyadharan, Ramakant, Gangishetty Akhilesh, Vaibhav Gupta, Anand Ravi	Part II: Benchmarking the Performance of Optimized TFET-Based Circuits with the Standard 45 nm CMOS Technology using Device & Circuit Co-Simulation Methodology	Book title: The Physics of Semiconductor Devices Publisher: Springer Nature Switzerland AG 2018 Book ISBN: 978-3-319-97603-7	2018

	and Surya Shankar Dan		Book ID: 454074_1_En Chapter 102	
4	Mithun Mondal and G.B. Kumbhar	Generalized Analytical Formulae to Compute Electrical Characteristics of a Homogenous Ladder Network of the Transformer Winding	International Journal of Circuit Theory & Applications	2018
5	Chetan Vudadha, Srinivasan Rajagopalan, Aditya Dusi, Sai Phaneendra P, M.B. Srinivas,	"Encoder-based Optimization of CNFET-based Ternary Logic Circuits" DOI: 10.1109/TNANO.2018.2800015	IEEE Transactions on Nanotechnology, vol. 17, no. 2, pp. 299-310, March 2018.	2018
6	Chetan Vudadha, Sai Phaneendra P and MB Srinivas.	"Energy Efficient Design of CNFET-based Multi-Digit Ternary Adders" DOI: https://doi.org/10.1016/j.mejo.2018.02.004	Microelectronics Journal (Elsevier), vol. 75, pp. 75-86, May 2018	2018
7	Syed Ershad Ahmed, Santhosh and MB Srinivas	Improved designs of digit-by-digit decimal multiplier https://doi.org/10.1016/j.vlsi.2017.12.001	Selected for publication in Integration Journal (Elsevier) (In Press)	2018
8	Syed Ershad Ahmed and MB Srinivas	An Improved Logarithmic Multiplier for Media Processing https://doi.org/10.1007/s1126	Selected for publication in Journal of Signal Processing System (Springer) (In Press)	2018
9	Sanket Goel	From waste to watts in micro-devices: Review on development of Membranedand Membraneless Microfluidic Microbial Fuel Cell	Applied Materials Today. Vol. 11, pp. 270–279, 2018	2018
10	Yogesh Jain, P. K. Sharma, Harish Dixit, Aviraj Jadhav, Mark Goniche, Julien Hillairet	RF Design of Passive Active Multijunction (PAM) Launcher for LHCD System of ADITYA-Upgrade Tokamak	Fusion Engineering and Design (In Press)	2018
11	Chetan Vudadha and MB Srinivas.	"Design of High Speed and Power Efficient Ternary Prefix Adders using CNFETs" DOI: 10.1109/TNANO.2018.2832649	IEEE Transactions on Nanotechnology, vol. 17, no. 4, pp. 772-782, July 2018.	2018
12	Chetan Vudadha, Ajay Surya K, Saurabh Agrawal and M B Srinivas	Synthesis of Ternary Logic Circuits using 2:1 Multiplexers	Selected for publication in IEEE Transactions on Circuits and Systems I: Regular Papers	2018
13	Prakash Rewatkar, Madhavi Bandapati and Sanket Goel	Optimized Bucky paper based Anode and Cathode Using Biocompatible Redox Mediator for Enzymatic Biofuel Cells	IEEE Sensors Journal, Vol. 18. No. 13, pp. 5395-5401	2018
14	Prakash Rewatkar and Sanket Goel	Paper based Membraneless Co-Laminar Microfluidic Glucose biofuel cell with MWCNT fed Bucky Paper Bioelectrodes	Accepted for publication with IEEE Transaction of Nanobioscience	2018
15	Hari Priya and Alivelu M Parimi	Hybrid Controller Topology for Large Solar PV Installations in High Voltage DC grid Connected Applications	Accepted for publication with Electrical Engineering Springer Journal	2018
16	Hari Priya and Alivelu M Parimi	Performance Analyses of PMSG based WECS using Hybrid Controller in DC	International Journal of Pure and Applied	2018

		Grid Connected Applications	Mathematics, Vol. 118 , Issue 17	
17	**Puneeth S B, Sai Akhil Puranam and Sanket Goel**	3D Printed Integrated and Automated Electro-Microfluidic Viscometer for Biochemical Applications	Accepted for publication with IEEE Transactions on Instrumentation & Measurement, Aug 2018.	2018
18	Shewata M, Nk.K Reddy, **Prasant Kumar Pattnaik** and K. Narayan	Design and analysis of silicon ring resonator for bio-sensing application	Proceedings of SPIE, Vol 10690, SPIE Optical Design and Engineering VII,106902R, doi: 10.1117/12.2313477	2018
19	**Manu Gupta, Prabhakara Rao and R. Venkateswaran**	Glioma grade classification using wavelet transform-local binary pattern based statistical texture features and geometric measures extracted from MRI	Journal of Experimental & Theoretical Artificial Intelligence	2018
20	D. Guillen, M R. Arrieta Paternina, JO Bezar, **RK Tripathy**, AZ Mendez, RT Olvera, ES Tellez	Fault Detection and Classification in Transmission Lines using PSD Index	IET Generation Transmission and Distribution, (Early access)	2018
21	**LM Satapathy, RK Tripathy, P Das**	A Combination of Variational Mode Decomposition and Histogram Equalization for Image Enhancement	National Academy Science Letters, Springer, doi: 10.1007/s40009-018-0742-y	2018
22	**P. Veda Bhanu, Pranav Venkatesh Kulkarni, Soumya J**	Fault-Tolerant Network-on-Chip Design with Flexible Spare Core Placement	Accepted for publication in ACM Journal on Emerging Technologies in Computing	2018
23	MRA Paternina, **RK Tripathy**, AZ Mendez, Daniel Dotta	Identification of Electromechanical Modes using Variational Mode Decomposition	Electric Power System Research, Elsevier (Accepted)	2018
24	**Madhavi Bandapati, Prakash Rewatkar and Balaji Krishnamurthy and Sanket Goel**	Functionalized and Enhanced HB Pencil Graphite as Bioanode for Glucose - O2 Biofuel Cell	IEEE Sensors Journal (Accepted)	2018
25	**HP Tripathy, Priyabrata Pattanaik, SK Kamilla, DK Mishra, RK Tripathy**	A Model based Approach to Validate the Aluminium Nitride Material based Ultrasonic MEMS Transceiver for Temperature Sensing	IET Micro and Nano Letters (Accepted)	2018
26	**Sravan K. Vittapu, Sumit K. Chatterjee**	Complexity reduction for HEVC encoder using multiplication free one-bit transformation	J. Electron. Imaging 27(6)	2018
27	**Shaikshavali Chitraganti and Samir Aberkane**	Stochastic H infinity control of state-dependent jump linear systems with state-dependent noise	IET Control Theory & Applications (Accepted)	2018

➢ Faculty Profile

Dr. Sanket Goel
   PhD (U of Alberta, Canada)
   Head & Associate Professor

Dr.BVVSN Prabhakar Rao.
   PhD (IIT Delhi)
   Associate Professor

Dr. M.B. Srinivas
   PhD (IISc Bangalore)
   Professor

Dr. Subendu K Sahoo
   PhD (BITS Pilani)
   Associate Professor

Dr.Alivelu Manga Parimi
   PhD (U of Technology, Petronas, Malaysia)
   Associate Professor

Dr. Prasant Kumar Pattnaik
   PhD (IISc Bangalore)
   Assistant Professor

Dr. Runa Kumari
   PhD (NIT Rourkela)
   Assistant Professor

Dr. Venkateswaran Rajagopalan
   PhD (Cleveland State University, U.S.A)
   Assistant Professor

Dr.Sumit Kumar Chatterjee
PhD (IIT Kharagpur)
Assistant Professor

Dr. Soumya J
PhD (IIT Kharagpur)
Assistant Professor

Dr. Souvik Kundu
PhD (IIT Kharagpur)
Assistant Professor

Dr. Surya Shankar Dan
PhD (IISc Bangalore)
Assistant Professor

Dr. Shaikshavali Chitraganti
PhD (U of Lorraine, France)
Assistant Professor

Dr. Saroj Mondal
PhD (IIT Guwahati)
Assistant Professor

Dr. Mithun Mondal
PhD (IIT Roorkee)
Assistant Professor

Dr. Radhika Sudha
PhD (Tokyo Polytechnic University, Japan)
Assistant Professor

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Dr. Harish V Dixit
PhD (VJTI/ Univ of Mumbai)
Assistant Professor

Dr. Syed Ershad Ahmed
PhD (BITS-Pilani)
Assistant Professor

Dr. Ponnalagu R N
PhD (IIT Madras)
Assistant Professor

Dr. Rajesh K Tripathy
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Assistant Professor

Dr. Manish Narwaria
PhD (NTU, Singapore)
Assistant Professor

Dr. Sayan Kanungo
PhD (IIEST Shibpur)
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Dr. Chetan Kumar
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Dr. Sourav Nandi
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Assistant Professor

Dr. K C Nanaiah
    PhD (University of Utah- 2013)
    Assistant Professor

Dr. Parikshit Sahatiya
    PhD (IIT Hyderabad)
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Sandeep Kumar
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