

Research Projects & Collaboration

Name of the Investigator	Title of the project and duration	Funding Agency	Amount sanctioned in Rs	Year
Dr. Mirza Tariq Beg	1. Modernization of Microprocessor laboratory 2. Modernization of Faculty Library	1. MHRD 2. MHRD	1. 10 Lakhs 2. 15 Lakhs	1993-1995
Dr. Sajad Ahmad Loan	Modernization of VLSI and Nanoelectronics Lab, JMI New Delhi	AICTE	7 Lakhs	2013-2014
Dr. Intekhab Amin	Design Considerations and Performance Assessment of Tunnel FET based Dielectrically Modulated Biosensor Device	UGC Start-up Grant under the MHRD/UGC - Empowered Committee's Basic Science Research (BSR) Program	10 Lakhs	2018-2020
Dr. Wasim Akram	Design and Simulation of Junctionless transistor based on SELBOX technology	UGC	10 Lakhs	2018-2020
D/O ECE	Project Sponsored under PURSE	DST	97 Lakhs	2017-2022

Product Development:

PhD, M. Tech. and even B. Tech. students work and research in various areas of electronics and communication engineering. In the area of VLSI students have designed various ASICs, in the area of Microwave and Antenna students have developed various working prototypes of antennae, and in the area of analog signal processing many circuits have been developed using commercially available ICs such as AD844, CA3080 etc.

Patents Filed by Faculty Members

Sl. No.	Name of the Applicant(s) /Assignee Name	Name of the Inventor(s)	Title	Application No. & Patent filed date	Current Status
1.	IIT Kanpur	Sajad A. Loan S. Qureshi S. S. K. Iyer	An Improved Lateral Bipolar Junction Transistor (BJT) on Selective Buried Oxide (SELBOX) and a Method For Manufacturing The Same	1478/DEL/2008 20/06/2008	Granted On 10/09/2018 Indian Patent No. 300909
2.	JMI New Delhi	Sajad A. Loan Sunil Kumar	Charge Plasma Based Normally-Off/Enhancement Mode GaN or III-V element based MOSFET: A Method of Manufacturing the Same	201611004695	Published
3.	JMI New Delhi	Sajad A. Loan Sunil Kumar	Polarization Engineered Enhancement Mode III-V Group Based Devices	201611018596	Published
4.	JMI New Delhi	Sajad A. Loan Sunil Kumar	A Novel Metal Source/Drain Schottky Device Based Digital Circuit Designing	2743/DEL/2015	Published
5.	JMI New Delhi	Sajad A. Loan Sunil Kumar	Gate Engineered Single Device for Implementing any Boolean Equation	201611036899	Published

Research Laboratories:

1. VLSI Design Lab

In VLSI lab, we train the students on the use of Hardware description languages. The tool/software used for this is Xilinx. Any HDL is used to describe hardware for a complicated system. In VLSI lab we introduce the students to VHDL language, used to describe a digital system. The students are told about various design units and modelling styles used in VHDL.

In this lab, the students are made to implement the various logic gates, verify their

truth table and implement Boolean functions using gates. Additionally, we also implement half adder, half subtractor, full adder, full subtractor circuit using logic gates. We also realize single bit comparator, multiplexer, digital-to-analog converter, SR latch, and flip-flops in this lab. Finally, the broad objective of the lab is to enable the student to do the programming of an FPGA and CPLD.

In addition to this PhD students are also working in this laboratory on various research areas namely, Low Power Device Designing, Wide Bandgap Semiconductor based devices, VLSI design, Circuit Designing and Nanoelectronics and Devices using the tools namely, ATLAS TCAD Device Simulator, Sentaurus TCAD Device Simulator and HSpice.

2. Optoelectronics and Optical Communication Lab

Aim of this lab is to give training in terms of handling of optical fibers, characterizing them and developing an understanding, which is to embark on advanced work in fiber optics and related areas like optical sensors.

List of experiments:

- i. Fiber end preparation and light coupling
- ii. Numerical aperture measurement
- iii. Micro bending loss and application in sensing
- iv. Mode field diameter of a single mode fiber
- v. Refractive index profile of a multimode fiber

In addition to basic experiments mentioned above, depending on the level of students, students are allowed to float several minor and major projects in the area of fiber optics.

For research work, the software used in lab is Optisystem 15. Optisystem is a comprehensive software design suite that enables users to plan, test, and simulate optical links in the transmission layer of modern optical networks.

3. Analog Signal Processing Lab

This lab is introduced to improve the understanding of basic analog signal processing/generation circuits. Applications of active building blocks such as Op-Amp, OTA, CFOA as filters, oscillators and amplifiers are analyzed using hardware and corresponding results are verified using Orcad PSpice software. The goal of this lab is to develop the practical concepts underlying filters and amplifiers in an intuitive manner, such that the students can thoroughly understand applications of analog integrated circuits as well as filter design and in generation of signals.

In addition to this, the lab is well equipped to cater the research needs of PhD students working in the area of analog signal processing. The published research work of scholars is also available in the laboratory.

4. Instrumentation and Sensors Lab

In this lab students are exposed to various electrical instruments like strain gauge, potentiometer, ohmmeter, Anderson's bridge, Maxwell's bridge, LVDT, CRO etc. They learn the working of above stated instruments. Some of the experiments are performed on breadboard with the help of components like resistors, inductors and capacitors. The main aim of lab is to relate the theoretical concepts with the instruments' working.

In addition to this research is being carried out by research scholars in the area of Wireless Sensor Networks using Wireless Flood Monitoring System Kit and MATLAB software in the Laboratory.

5. Advanced Communication Lab

The communication laboratory is well equipped with analog communication kits such as amplitude modulation and demodulation, phase modulation and demodulation, frequency modulation and demodulation, noise generator and digital communication kits like PCM, DM, PPM, ADM, ASK, FSK, PSK, QAM.

Students also carry out the study of GPS transponder, mobile communication, GSM using various kits in the laboratory.

In addition to this research is being carried out in the area of mobile communication, MAC Layer Protocol designing, Antenna designing using QualNet, MATLAB and HFSS softwares.

Research Collaboration

S. No.	Partner Institute
1	University of Waterloo, Canada
2	Indian Institute of Technology, Kanpur
3	Indian Institute of Technology Bombay under INUP Program
4	Aligarh Muslim University
5	King Saud University, Saudi Arabia
6	NIT, Srinagar