



## Communication Systems

This Lab covers a wide range of topics in Communications such as analog communication systems, digital communication systems, and Wireless and RF communications.

Students are guided through hands-on experiments in analog and digital communications. These experiments lay emphasis on design aspects and performance analysis of different systems, techniques and methods. Students also learn how to simulate and prototype advance wireless and RF communication systems, such as: GSM, WCDMA, GPS, MIMO, DVB-T, OFDM, ZigBee, WiMAX.

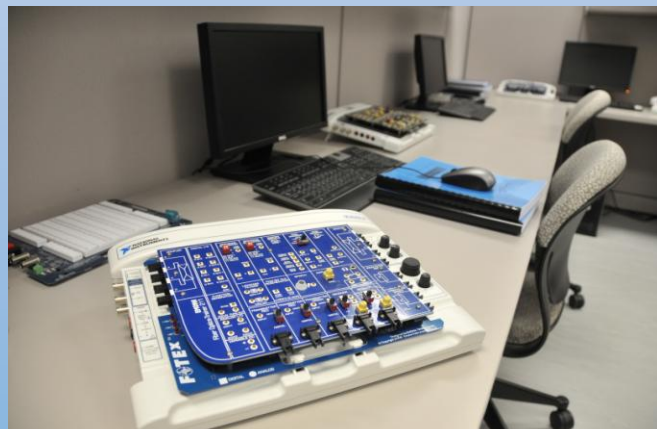
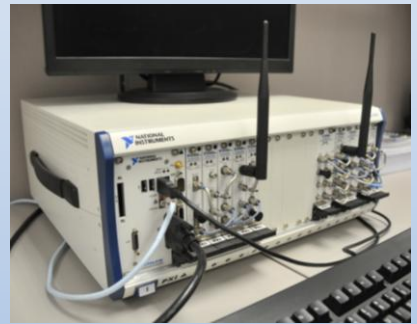
This Lab is based on National Instruments LabVIEW, MATLAB, and PXI Hardware.

## Digital Signal Processing

In this lab, students get hands-on experience through performing a wide range of experiments including; fast Fourier transform, z-transform, Multirate DSP, design of infinite impulse response filter (IIR) and finite impulse response (FIR). The experiments in this lab are based on DSP Module for NI SPEEDY-33 hardware and LabVIEW Embedded Module for ADI Blackfin processors.

### Major Equipment

- Digital Analog Telecommunications Experimenter DATEx™ for NI ELVIS
- Fiber Optics Telecommunications Experimenter FOTEx™ for NI ELVIS
- PXI RF platforms: A flexible, modular approach to design and exploration



## Experiments

### DATEx

- AM modulation and demodulation
- DSBSC and SSB modulation and demodulation
- FM modulation and demodulation
- Sampling and reconstruction
- PCM encoding and decoding
- ASK, FSK, BPSK and QPSK
- DSSS modulation and demodulation

### FOTEx

- PCM encoding and decoding
- Line coding and bit-clock regeneration
- Fiber optic transmission
- PCM-TDM 'T1' implementation
- Fiber optic bi-directional communication
- TDMA, WDM
- Optical losses

### PXI platform

- Bluetooth
- Broadcast radio and video
- GPS, GSM/EDGE
- MIMO, RFID
- WCDMA, WiMAX
- WLAN, ZigBee